

# *Catalogue* 2015

**Computer Science and Engineering**  
**Information Technology**

**Engineering**

(Electrical, Electronics, Mechanical, Civil  
Chemical, Metallurgy, and Agricultural)



**PHI Learning**

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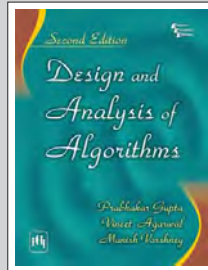
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### Design and Analysis of Algorithms, 2nd ed.



**PRABHAKAR GUPTA**, Professor and Dean (Academics) at Shri Ram Murti Smarak College of Engineering and Technology (SRMSCET), Bareilly (UP).

**VINEET AGARWAL**, Professor, Computer Science and Engineering, Rakshapal Bahadur College of Engineering and Technology, Bareilly.

**MANISH VARSHNEY**, Associate Professor and Head of Computer Science & Engineering Department at Shri Siddhi Vinayak Institute of Technology, Bareilly.

This well organized text provides the design techniques of algorithms in a simple and straight forward manner. It describes the complete development of various algorithms along with their pseudo-codes in order to have an understanding of their applications.

The book begins with a description of the fundamental concepts and basic design techniques of algorithms. Gradually, it introduces more complex and advanced topics such as dynamic programming, backtracking and various algorithms related to graph data structure. Finally, the text elaborates on NP-hard, matrix operations and sorting network.

Primarily designed as a text for undergraduate students of Computer Science and Engineering and Information Technology (B.Tech., Computer Science, B.Tech. IT) and postgraduate students of Computer Applications (MCA), the book would also be quite useful to postgraduate students of Computer Science and IT (M.Sc., Computer Science; M.Sc., IT).

#### NEW TO THIS SECOND EDITION

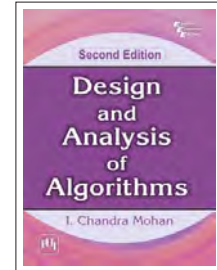
- A new section on *Characteristics of Algorithms* (Section 1.3) has been added
- Five new sections on *Insertion Sort* (Section 2.2), *Bubble Sort* (Section 2.3), *Selection Sort* (Section 2.4), *Shell Sort/Diminishing Increment Sort/Comb Sort* (Section 2.5) and *Merge Sort* (Section 2.6) have been included
- A new chapter on *Divide and Conquer* (Chapter 5) has also been incorporated

**CONTENTS:** Preface. Preface to the First Edition. Acknowledgements. Introduction to Algorithms. Sorting and Order Statistics. Elementary Data Structure. Advanced Data Structure. Divide and Conquer. Advanced Design and Analysis Techniques—Part I. Advanced Design and Analysis Techniques—Part II. Graph. Pattern Matching Algorithms. NP-Completeness. Glossary. References. Index.

Latest Print 2012 / 424 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4663-5 / ₹ 350.00



### Design and Analysis of Algorithms, 2nd ed.



**I. CHANDRA MOHAN** was Professor and Head, Department of Mathematics, S.V. University, Tirupati.

This book, on Design and Analysis of Algorithms, in its second edition, presents a detailed coverage of the time complexity of algorithms. In this edition, a number of chapters have been modified and updated with new material. It discusses the various design factors that make one algorithm more efficient than others, and explains how to devise the new algorithms or modify the existing ones.

The book begins with an introduction to algorithm analysis and then presents different methods and techniques—divide and conquer methods, the greedy method, search and traversal techniques, backtracking methods, branch and bound methods—used in the design of algorithms. Each algorithm that is written in this book is followed first by a detailed explanation and then is supported by worked-out examples. The book contains a number of figures to illustrate the theoretical aspects and also provides chapter-end questions to enable students to gauge their understanding of the underlying concepts. What distinguishes the text is its compactness, which has been achieved without sacrificing essential subject matter.

This text is suitable for a course on “Design and Analysis of Algorithms”, which is offered to the students of B.Tech (Computer Science and Engineering) and undergraduate and postgraduate students of computer science and computer applications [BCA, MCA, B.Sc. (CS), M.Sc. (CS)] and other computer-related courses.

#### NEW TO THIS EDITION

- Explains in detail the time complexity of the algorithms for the problem of finding the GCD and matrix addition.
- Covers the analysis of Knapsack and Combinatorial Search and Optimization problems.
- Illustrates the “Branch-and-Bound” method with reference to the Knapsack problem.
- Presents the theory of NP-Completeness.

**CONTENTS:** Preface. Preface to the First Edition. Acknowledgements. Fundamentals. Divide-and-Conquer Methods. The Greedy Method. Set Manipulation Algorithms. Dynamic Programming. Search and Traversal Techniques. Backtracking Methods. Branch and Bound Methods. Algebraic Simplification and Transformation. Lower Boundary Theory and NP-Hard and NP-Complete Problems. Index.

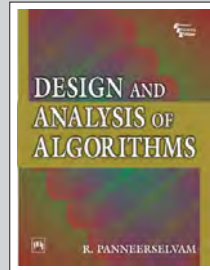
Latest Print 2012 / 200 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-4575-1 / ₹ 175.00



## COMPUTER SCIENCE AND ENGINEERING

### Algorithms

#### Design and Analysis of Algorithms



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

This highly structured text provides comprehensive coverage of design techniques of algorithms. It traces the complete development of various algorithms in a stepwise approach followed by their pseudo-codes to build an understanding of their application in practice.

With clear explanations, the book analyzes different kinds of algorithms such as distance-based network algorithms, search algorithms, sorting algorithms, probabilistic algorithms, and single as well as parallel processor scheduling algorithms. Besides, it discusses the importance of heuristics, benchmarking of algorithms, cryptography, and dynamic programming.

#### KEY FEATURES

- Offers in-depth treatment of basic and advanced topics.
- Includes numerous worked examples covering varied real-world situations to help students grasp the concepts easily.
- Provides chapter-end exercises to enable students to enhance their mastery of the subject.

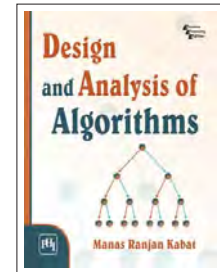
This text is especially designed for students of B.Tech and M.Tech (Computer Science and Engineering and Information Technology), MCA, and M.Sc. (Computer Science and Information Technology). It would also be useful to undergraduate students of electrical and electronics and other related engineering disciplines where a course in algorithms is prescribed.

**CONTENTS:** Preface. Introduction. Graphs. Data Structure. Distance-Based Network Algorithms. Search Algorithms. Sorting Algorithms. Heuristics. Meta-Heuristics. Cryptography. Probabilistic Algorithms. Dynamic Programming. Benchmarking of Algorithms. Algorithms to Schedule Processor(s). Miscellaneous Algorithms. Bibliography. Index.



Latest Print 2011 / 440 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3278-2 / ₹ 275.00

#### Design and Analysis of Algorithms



**MANAS RANJAN KABAT**, Reader and Head, Department of Computer Science and Engineering, VSS University of Technology, Burla, Odisha.

Primarily designed as a text for undergraduate students of computer science and engineering and information technology, and postgraduate students of computer applications, the book would also be useful to postgraduate students of computer science and IT (M.Sc., Computer Science; M.Sc., IT). The objective of this book is to expose students to basic techniques in algorithm design and analysis.

This well organized text provides the design techniques of algorithms in a simple and straightforward manner. Each concept is explained with an example that helps students to remember the algorithm devising techniques and analysis. The text describes the complete development of various algorithms along with their pseudo-codes in order to have an understanding of their applications. It also discusses the various design factors that make one algorithm more efficient than others, and explains how to devise the new algorithms or modify the existing ones.

#### KEY FEATURES

- Randomized and approximation algorithms are explained well to reinforce the understanding of the subject matter.
- Various methods for solving recurrences are well explained with examples.
- NP-completeness of various problems are proved with simple explanation.

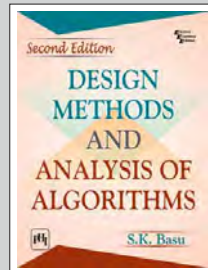
**CONTENTS:** Preface. Acknowledgements. Introduction: Design and Analysis of Algorithm. Solving Recurrences. Fundamentals of Data Structures. Search Trees. Analysis of Searching and Sorting. Greedy Method. Dynamic Programming. Backtracking. Branch and Bound Technique. Polynomials and Matrices. Amortized Analysis. String-Matching Algorithms. Computational Geometric Algorithms. NP-Complete Problems. Randomized and Approximation Algorithm. Bibliography. Index.

Latest Print 2013 / 356 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4806-6 / ₹ 295.00



## Design Methods and Analysis of Algorithms, 2nd ed.

**S.K. BASU**, Professor, Department of Computer Science, Banaras Hindu University.



The design of correct and efficient algorithms for problem solving lies at the heart of computer science. This concise text, without being highly specialized, teaches the skills needed to master the essentials of this subject. With clear explanations and engaging writing style, the book places increased emphasis on algorithm design techniques rather than programming in order to develop in the reader the problem-solving skills.

The treatment throughout the book is primarily tailored to the curriculum needs of B.Tech students in computer science and engineering, B.Sc. (Hons.) and M.Sc. students in computer science, and MCA students.

The book focuses on the standard algorithm design methods and the concepts are illustrated through representative examples to offer a reader-friendly text. Elementary analysis of time complexities is provided for each example-algorithm. A varied collection of exercises at the end of each chapter serves to reinforce the principles/methods involved.

### NEW TO THIS EDITION

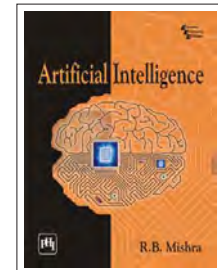
- Additional problems
- A new Chapter 14 on Bioinformatics Algorithms
- The following new sections:
  - BSP model (Chapter 0)
  - Some examples of average complexity calculation (Chapter 1)
  - Amortization (Chapter 1)
  - Some more data structures (Chapter 1)
  - Polynomial multiplication (Chapter 2)
  - Better-fit heuristic (Chapter 7)
  - Graph matching (Chapter 9)
  - Function optimization, neighbourhood annealing and implicit elitism (Chapter 12)
- Additional matter in Chapter 15 and Appendix

**CONTENTS:** List of Figures. List of Tables. Preface. Preface to the First Edition. Acknowledgements. Computational Models. Basics of Algorithm. Divide and Conquer. Greedy Method. Dynamic Programming. Further Divide and Conquer. A Bit of Theory. Approximation Algorithms. Randomized Algorithms. Graph Algorithms. Backtracking. Branch and Bound. Lower Bound Techniques. Genetic Algorithms. Parallel Algorithms. Bioinformatics Algorithms. Conclusion. Appendix. Bibliography. Index.



Latest Print 2013 / 396 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4746-5 / 350.00

## Artificial Intelligence



**R.B. MISHRA**, Professor, Department of Computer Engineering, Institute of Technology, Banaras Hindu University, Varanasi.

This book has been written keeping in view the requirements of undergraduate and postgraduate students and research scholars in the area of computer science and engineering in particular, and other branches of engineering which deal with the study of AI such as electronics engineering, electrical engineering, industrial engineering (robotics and FMS). Besides the engineering students, the postgraduate students of computer science and computer applications and cognitive sciences researchers can equally benefit from this text.

The basic concepts of artificial intelligence, together with knowledge representation, reasoning methods, acquisition, management and distributed architecture, have been nicely and instructively described. The various application domains and disciplines in engineering, management, medicine which cover different aspects of design, assembly and monitoring, have been presented with utility aspects of AI concepts in logic and knowledge.

The book maintains a simple and comprehensible style of presentation for the different categories of readers such as students, researchers and professionals for their respective uses.

**CONTENTS:** Preface. Introduction. Logic and Computation. Heuristic Search. AI in Game Playing. AI Languages. Knowledge Representation. Automated Reasoning. Probabilistic Reasoning. Knowledge Acquisition: Machine Learning. Multi-agent Systems. User Interface. Knowledge Based Systems. Knowledge Discovery: Data and Web Mining. Web Technology, Semantic Web and Knowledge Management. Natural Language Processing. Development, Selection and Evaluation. Software Engineering and AI. AI in Medicine. Industrial Automation: FMS and Robotics. Electronics Communication. Management and Business Intelligence. References. Index.

Latest Print 2013 / 520 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3849-4 / 375.00



## COMPUTER SCIENCE AND ENGINEERING

### Artificial Intelligence

#### Artificial Intelligence

#### Artificial Intelligence

PARAG KULKARNI  
PRACHI JOSHI

**PARAG KULKARNI**, Director and Chief Scientist, Anomaly Solutions Pvt. Ltd., an organisation building AI-based solutions and products.

**PRACHI JOSHI**, Associate Professor, Department of Computer Engineering, MIT College of Engineering, Pune.

There has been a movement over the years to make machines intelligent. With the advent of modern technology, AI has become the core part of day-to-day life. But it is accentuated to have a book that keeps abreast of all the state-of-the-art concepts (pertaining to AI) in simplified, explicit and elegant way, expounding on ample examples so that the beginners are able to comprehend the subject with ease.

The book on Artificial Intelligence, dexterously divided into 21 chapters, fully satisfies all these pressing needs. It is intended to put each and every concept related to intelligent system in front of the readers in the most simplified way so that while understanding the basic concepts, they will develop thought process that can contribute to the building of advanced intelligent systems.

Various cardinal landmarks pertaining to the subject such as problem solving, search techniques, intelligent agents, constraint satisfaction problems, knowledge representation, planning, machine learning, natural language processing, pattern recognition, game playing, hybrid and fuzzy systems, neural network-based learning and future work and trends in AI are now under the single umbrella of this book, thereby showing a nice blend of theoretical and practical aspects.

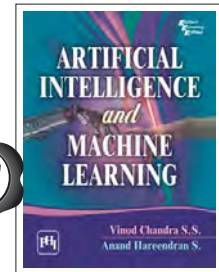
With all the latest information incorporated and several pedagogical attributes included, this textbook is an invaluable learning tool for the undergraduate and postgraduate students of computer science and engineering, and information technology.

**CONTENTS:** Preface. Introduction to Artificial Intelligence. Problem Solving. Uninformed Search. Informed Search. Intelligent Agent. Constraint Satisfaction Problems. Knowledge and Reasoning. Uncertain knowledge and reasoning. Planning. Learning. Expert Systems. Natural Language Processing. Decision Theory. Pattern Recognition. Game Playing. Perception and action. Neural Network based Learning. Fuzzy and Hybrid Intelligent Systems. AI Applications. Concluding Remarks: AI—Present and Future. Advance topics in Artificial Intelligence. Appendices. Bibliography. Index.

496 pp. (approx.) / 17.8 × 23.5 cm  
ISBN-978-81-203-5046-5 / FORTHCOMING

PHI Learning: Publications

#### Artificial Intelligence and Machine Learning



**S.S. VINOD CHANDRA**, Director, Computer Centre, University of Kerala, Thiruvananthapuram.

**ANAND HAREENDRAN S.**, is associated with Department of Computer Science and Engineering, College of Engineering, Kulathoor, Sreekaryam, Trivandrum.

Primarily intended for the undergraduate and postgraduate students of computer science and engineering, this text bridges the gaps in knowledge of the seemingly difficult areas of artificial intelligence and machine learning.

This book promises to provide the most number of case studies and worked out examples than any other of its genre. The text is written in a highly interactive manner which makes for an avid reading. More into the text, the contents are well placed that it takes off from the introduction to AI, which is followed by heuristics searching and game playing. The machine learning section begins with the basis of learning, and the various association rule learning algorithms. Various types of learning like, reinforced, supervised, unsupervised and statistical are also included with numerous case studies and application exercises. The well explained algorithms and pseudo codes for each topic make this book useful for students.

#### KEY FEATURES

- Includes Case studies for each machine learning algorithm
- Incorporates day to day examples and pictorial representations for a deeper understanding of the subject
- Helps students to create programs easily

**CONTENTS:** Preface. Acknowledgements. Introduction. Heuristic Search Techniques. Game Playing. Knowledge Representation. Knowledge Representation Structures. Reasoning. Learning. Association Learning. Clustering. Reinforcement Learning. Statistical Learning. Artificial Neural Nets. Supervised Learning. Unsupervised Learning. Expert Systems. Index.

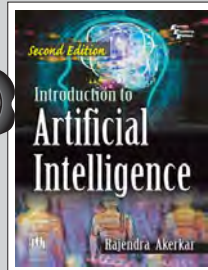
Latest Print 2014 / 368 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4934-6 / ₹ 450.00





## Introduction to Artificial Intelligence, 2nd ed.

**RAJENDRA AKERKAR,**  
Professor of Information  
Technology at Western Norway  
Research Institute, Norway.



This comprehensive text acquaints the readers with the important aspects of artificial intelligence (AI) and intelligent systems and guides them towards a better understanding of the subject.

The text begins with a brief introduction to artificial intelligence, including application areas, its history and future, and programming. It then deals with symbolic logic, knowledge acquisition, representation and reasoning. The text also lucidly explains AI technologies such as computer vision, natural language processing, pattern recognition and speech recognition. Topics such as expert systems, neural networks, constraint programming and case-based reasoning are also discussed in the book.

In the **Second Edition**, the contents and presentation have been improved thoroughly and in addition six new chapters providing a simulating and inspiring synthesis of new artificial intelligence and an appendix on AI tools have been introduced.

The treatment throughout the book is primarily tailored to the curriculum needs of B.E./B.Tech. students in Computer Science and Engineering, B.Sc. (Hons.) and M.Sc. students in Computer Science, and MCA students. The book is also useful for computer professionals interested in exploring the field of artificial intelligence.

### KEY FEATURES

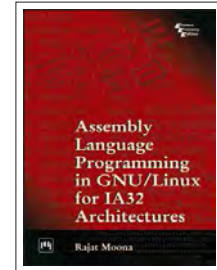
- Exposes the readers to real-world applications of AI.
- Concepts are duly supported by examples and cases.
- Provides appendices on PROLOG, LISP and AI Tools.
- Incorporates most recommendations of the Curriculum Committee on Computer Science/Engineering for AI and Intelligent Systems.
- Exercises provided will help readers apply what they have learned.

**CONTENTS:** Preamble. Overview of Artificial Intelligence. Symbolic Logic. Knowledge Acquisition and Representation. Reasoning and KRR Systems. Uncertainty. Search Techniques. AI Technologies. Expert Systems. Neural Networks. Case-Based Reasoning. Constraint Programming. Intelligent Agents. Planning. Soft Computing. Robotics. Machine Learning. Intelligent Systems. Applications of Artificial Intelligence. Appendices—A: Projects. B: PROLOG. C: LISP. D: AI Tools. Glossary. Bibliography. Index.

Latest Print 2014 / 440 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4997-1 / ₹ 425.00



## Assembly Language Programming in GNU/Linux for IA32 Architectures



**RAJAT MOONA,** Professor of Computer Science and Engineering at Indian Institute of Technology Kanpur.

This book provides an easy-to-understand, step-by-step approach to learning the fundamentals of Assembly language programming for Intel's architectures, using a GNU/Linux-based computer as a tool. Offering students of computer science and engineering a hands-on learning experience, the book shows what actions the machine instructions perform, and then presents sample programs to demonstrate their application.

The book is suitable for use during courses on Micro-processors, Assembly language programming, and Computer Organization in order to understand the execution model of processors. This knowledge also helps strengthen concepts when students go on to study operating systems and compiler construction.

The concepts introduced are reinforced with numerous examples and review exercises. An Instructor's CD provides all the programs given in the book and the solutions to exercises.

### KEY FEATURES

- Discusses programming guidelines and techniques of using Assembly language programs
- Shows techniques to interface C and Assembly language programs
- Covers instructions from general purpose instruction sets of IA32 processors
- Includes MMX and MMX-2 instructions
- Covers SSE and SSE-2 instructions
- Explains input-output techniques and their use in GNU/Linux-based computers
- Explains GNU/Linux system calls along with methods to use them in programs
- Provides a list of suggested projects
- Gives ample references to explore further

**CONTENTS:** Preface. Introduction. IA32 Processors. Basic Data Manipulation. Control Transfer. Arithmetic and Logic Instructions. String and Bit-Oriented Instructions. Linux Kernel Interface. Input-Output in Linux. Handling Real Number Arithmetic. SIMD Instruction Sets. Assembler Directives and Macros. **Appendices**—A: Number Representation System. B: IA32 Processor Instruction Set. C: Suggested Programming Exercises. D: GNU Assembler. E: GNU Linker. F: GNU Debugger. G: ASCII Character Set. H: References. Index.

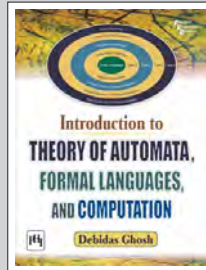
Latest Print 2009 / 468 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-3156-3 / ₹ 350.00



## COMPUTER SCIENCE AND ENGINEERING

### Automata/Theory of Computer Science

#### Introduction to Theory of Automata, Formal Languages, and Computation



**DEBIDAS GHOSH**, Professor of Computer Science and Engineering (CSE) Department, National Institute of Technology (NIT), Durgapur.

The Theory of Computation or Automata and Formal Languages assumes significance as it has a wide range of applications in compiler design, robotics, Artificial Intelligence (AI), and knowledge engineering. This compact and well-organized book provides a clear analysis of the subject with its emphasis on concepts which are reinforced with a large number of worked-out examples.

The book begins with an overview of mathematical preliminaries. The initial chapters discuss in detail about the basic concepts of formal languages and automata, the finite automata, regular languages and regular expressions, and properties of regular languages. The text then goes on to give a detailed description of context-free languages, pushdown automata and computability of Turing machine, with its complexity and recursive features. The book concludes by giving clear insights into the theory of computability and computational complexity.

This text is primarily designed for undergraduate (BE/B.Tech.) students of Computer Science and Engineering (CSE) and Information Technology (IT), postgraduate students (M.Sc.) of Computer Science, and Master of Computer Applications (MCA).

#### SALIENT FEATURES

- One complete chapter devoted to a discussion on undecidable problems.
- Numerous worked-out examples given to illustrate the concepts.
- Exercises at the end of each chapter to drill the students in self-study.
- Sufficient theories with proofs.

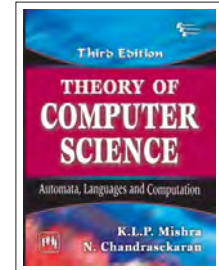
**CONTENTS:** Preface. Acknowledgements. Preliminary Mathematical Review. Three Basic Concepts: Grammar, Languages and Automata. Finite Automata. Regular Languages and Regular Grammars. Properties of Regular Languages. Context-Free Languages. Pushdown Automata. Properties of Context-Free Languages. Turing Machine. Other Models of Turing Machines. Hierarchy of Formal Languages and Linear Bounded Automata. Undecidability. Theory of Computability. Computational Complexity. Index.

Latest Print 2013 / 260 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4807-3 / ₹ 250.00



PHI Learning: Publications

#### Theory of Computer Science (Automata, Languages and Computation), 3rd ed.



**K.L.P. MISHRA**, Formerly Professor, Department of Electrical and Electronics Engineering, and Principal, Regional Engineering College, Tiruchirapalli.

**N. CHANDRASEKARAN**, Formerly Professor of Mathematics, St. Joseph's College, Tiruchirapalli.

This Third Edition, in response to the enthusiastic reception given by academia and students to the previous edition, offers a cohesive presentation of all aspects of theoretical computer science, namely **automata**, **formal languages**, **computability**, and **complexity**. Besides, it includes coverage of mathematical preliminaries.

#### NEW TO THIS EDITION

- Expanded sections on pigeonhole principle and the principle of induction (both in Chapter 2)
- A rigorous proof of Kleene's theorem (Chapter 5)
- Major changes in the chapter on Turing machines (TMs)
  - A new section on high-level description of TMs
  - Techniques for the construction of TMs
  - Multitape TM and nondeterministic TM
- A new chapter (Chapter 10) on decidability and recursively enumerable languages
- A new chapter (Chapter 12) on complexity theory and NP-complete problems
- A section on quantum computation in Chapter 12.

#### KEY FEATURES

- Objective-type questions in each chapter—with answers provided at the end of the book.
- Eighty-three additional solved examples—added as Supplementary Examples in each chapter.
- Detailed solutions at the end of the book to chapter-end exercises.

The book is designed to meet the needs of the undergraduate and postgraduate students of computer science and engineering as well as those of the students offering courses in computer applications.

**CONTENTS:** Preface. Notations. Propositions and Predicates. Mathematical Preliminaries. The Theory of Automata. Formal Languages. Regular Sets and Regular Grammars. Context-Free Languages. Push-down Automata. LR(*k*) Grammars. Turing Machines and Linear Bounded Automata. Decidability and Recursively Enumerable Languages. Computability. Complexity. Answers to Self-Tests. Solutions (or Hints) to Chapter-end Exercises. Further Reading. Index.

Latest Print 2014 / 436 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-2968-3 / ₹ 275.00



## COMPUTER SCIENCE AND ENGINEERING

### Bioinformatics

#### Bioinformatics: A Modern Approach

**VITTAL R. SRINIVAS**, was a Project Officer in the Department of Biotechnology, Indian Institute of Technology Madras.



This text not only deals with the basic concepts but it also emphasizes the technical and practical aspects of the subject. It covers the computational tools in bioinformatics, algorithmic aspects as well as technological aspects.

Besides it gives a clear exposition of Viterbi algorithm, Hidden Markov models, UPGMA, FM algorithm, heuristic, developing and using substitution matrices, HMMs and derivation of a number of standard formulae in information theory and statistics.

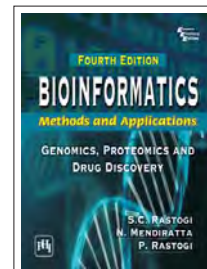
Finally the text focusses on the technological aspects of bioinformatics such as sequencing through shot gun methods, microarrays, with a variety of unsupervised methods in data analysis with examples, as well as interdisciplinary research in systems biology.

The book is primarily intended as a text for the students of Computer Science, Information Technology, under-graduate students of Bioinformatics, PGDCA and biological sciences and biotechnology. It should also be of considerable interest for research scientist in Chemistry and Pharmacy.

**CONTENTS:** List of Figures. List of Tables. Preface. Acknowledgements. Prologue. Introduction. Part I: Introduction to Bioinformatics—Getting Started with Linux. Part II: Programming, Database Management and Information Theory—World Wide Web. Perl and Java. Information Theory. Part III: Sequence Databases and Sequence Analysis—National Center for Biotechnology Information (NCBI). Blast and Fasta: A Search for Similarity. Part IV: Multiple Sequence Alignment, Phylogenetic Analysis and Gene Prediction—Pairwise Sequence Alignment and Dynamic Programming. Phylogeny. Gene Prediction. Part V: Protein Databases, Protein Domain Searching, and Structure Prediction—Protein Data Bank (PDB). Domain Assignment and Searching. Native Structure Prediction and Protein Folding Prediction. Part VI: Sequencing and Genome Mapping—Genome Sequencing. Maps. Part VII: Microarrays and Systems Biology—Why the Buzz About Microarrays? Microarray Design, Data Acquisition and Analysis. Proteomics. Systems Biology—The Holy Grail of Integration. Public Domain Databases and Analysis Tools: A Compendium. Model Questions. Appendix: Fundamentals of Probability. Epilogue. Bibliography. Index.

Latest Print 2009 / 280 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2858-7 / ₹ 195.00

#### Bioinformatics: Methods and Applications: Genomics, Proteomics and Drug Discovery, 4th ed.



**S.C. RASTOGI**, formerly Professor and Head, Biological Sciences Group at Birla Institute of Technology and Science (BITS), Pilani.

**NAMITA MENDIRATTA**, Vice-President, IL&FS Technologies, New Delhi.

**PARAG RASTOGI**, has worked in industry in various capacities in IT and consulting.

Designed as a text for students and professionals pursuing careers in the fields of molecular biology, pharmacy and bioinformatics, the fourth edition continues to offer a fascinating and authoritative treatment of the entire spectrum of bioinformatics, covering a wide range of high-throughput technologies. In this edition, four new chapters are included and two chapters are updated.

As a student-friendly text, it embodies several pedagogic features such as detailed examples, chapter-end problems, numerous tables, a large number of diagrams, flow charts, a comprehensive glossary and an up-to-date bibliography. This book should prove an invaluable asset to students and researchers in the fields of bioinformatics, biotechnology, computer-aided drug design, information technology, medical diagnostics, molecular biology and pharmaceutical industry.

**CONTENTS:** Preface. Preface to the First Edition. Bioinformatics: An Introduction. Introduction to Biological Database. Information Search and Data Retrieval. Genome Analysis and Gene Mapping. Alignment of Pairs of Sequences. Alignment of Multiple Sequences and Phylogenetic Analysis. Introduction to Phylogenetics. Methods of Phylogenetic Analysis. Tools for Similarity Search and Sequence Alignment. Profiles and Hidden Markov Models. Gene Identification and Prediction. RNA Structure Prediction. Gene Expression and Microarrays. Protein Classification and Structure Visualization. Protein Structure Prediction. Proteomics. Computational Methods for Pathways and Systems Biology. Introduction to Drug Discovery. Drug Discovery: Technology and Strategies. Cell Cycle: Key to Drug Discovery. Structural Biology and Virtual Screening for Drug Discovery. Emerging Role of Biomarkers in Drug Development. G-Protein Coupled Receptors as Drug Targets. Ion Channels and Aquaporins as Potential Drug Targets. Computer-aided Drug Design. Problem Sets. Multiple Choice Questions. Glossary. Bibliography. Index.

Latest Print 2013 / 648 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4785-4 / ₹ 475.00



PHI Learning: Publications

## Bluetooth Technology and Its Applications with *JAVA* and *J2ME*



**C.S.R. PRABHU**, Deputy Director General and State Informatics Officer, National Informatics Centre (NIC), Andhra Pradesh State Unit, Hyderabad.

**A. PRATHAP REDDI**, Senior Technical Consultant, STEP Online, Bangalore.

Bluetooth is a short range wireless radio technology standard that packs the potential to meet the demands of the present and of the future. Bluetooth is the most secure among all wireless technologies.

This up-to-date, well-organized book provides a comprehensive coverage of Bluetooth and shows how various Bluetooth-enabled applications can be developed in Java and J2ME.

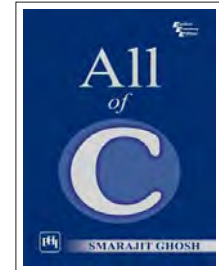
The text provides a detailed description and a skilful analysis of the techniques involved in developing Bluetooth-enabled applications with a host of illustrative codes.

This book, which treats a topic of current interest, will be extremely useful to students of computer science as well as to professionals in the field.

**CONTENTS:** Preface. Introduction to Wireless Technologies. Introduction to Bluetooth. Bluetooth Radio. Bluetooth Networking. Connection Establishment. Security. Profiles and Usage Models. Hardware. Protocol Implementation. Protocol Interaction with Layers. Assigned Numbers. Programming with Java. Javax.bluetooth Package. Javax.obex Package. Bluetooth Sample Applications. Bluetooth Service Registration and Search Applications. Bluetooth Client and Server Applications. Bluetooth Constants. Bluetooth Applications with J2ME. Other Wireless Technologies: IrDA, HomeRF, Wireless LANs and Jini. Bluetooth Careers. Index.

Latest Print 2009 / 340 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2443-5 / ₹ 250.00

## All of C



**SMARAJIT GHOSH**, Professor and Head, Department of Electrical and Instrumentation Engineering, Thapar University, Patiala.

Designed as a text for the students of computer science, computer applications, all branches of engineering, and also for those pursuing courses in ICT (Information Communication Technology) related subjects, this book is suitable for anyone new to programming in C. It teaches the readers all about C—introduces the basic programming concepts, how to program, then moves on to a thorough discussion of advanced techniques and features of C. Though a new title, it is a completely reorganized, thoroughly revised and fully updated version of the author's earlier book *Programming in C*.

Highly practical in nature, the text is enriched throughout with numerous worked-out examples to help the reader grasp the application of the concepts discussed. Each chapter concludes with a section 'Test Yourself' (with answers) that provides students with an opportunity to solve plenty of interesting problems and coding assignments. Besides the book offers the following special features in three separate sections to help students build competence in programming and to prepare them to attempt solutions to real-life assignments.

- 75 Solved Programs
- 120 Multiple Choice Questions
- 88 Confidence Building Programs

**CONTENTS:** Preface. Acknowledgements. Number Systems, Codes, and Boolean Algebra. Unix. Structure of C Programming. Basic Elements. Operators and Expressions. Input and Output Operations. Control Statements. Arrays. Character Strings. User-Defined Functions. Pointers. Structures and Unions. File Management. Introduction to Data Structures in C. Solved Programs. Multiple Choice Questions. Build Up Your Confidence. Index.

Latest Print 2013 / 492 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-3520-2 / ₹ 295.00



## COMPUTER SCIENCE AND ENGINEERING

### C Programming

#### C Learning and Building Business and System Applications, 2nd ed.



**SUSANT K. ROUT**, Founder, LIT Susant K. Rout Centre of Excellence, Bhubaneswar.

This book offers an in-depth introduction to C programming language—from the basics to the advanced concepts. It is application oriented, too. The text is interspersed with numerous worked-out examples to help readers grasp the application of concepts discussed.

The second edition includes an additional chapter on Inter Process Communication.

The book is suitable for several categories of readers—from beginners to programmers or developers. It is also suitable for students in engineering and science streams and students pursuing courses in computer applications.

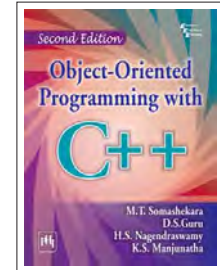
**CONTENTS:** Preface. Acknowledgements. Getting Started. Programming Environment. Data Types. Operators. Control Structures. Pointers. Arrays. Functions. Storage Classes. C Preprocessor. Structures and Unions. Memory Allocation. Files. Command Line Arguments. Processes. Threads. Inter Process Communication. Networking/Socket Programming. ODBC Programming. Working with Curses Library. Graphics Program Using GTK+ and Glade Interface. Development Tools. Index.



Latest Print 2013 / 488 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4748-9 / ₹ 350.00

### C++ Programming

#### Object-Oriented Programming with C++, 2nd ed.



**M.T. SOMASHEKARA**,  
Department of Computer Science  
and Applications, University of  
Bangalore.

**D.S. GURU**, Department of Studies  
in Computer Science, University of  
Mysore.

**H.S. NAGENDRASWAMY**, Department of Studies in  
Computer Science, University of Mysore.

**K.S. MANJUNATHA**, Department of Computer Science,  
Maharani's Science College, Mysore.

This book is the second edition of M.T. Somashekara's earlier book titled *Programming in C++*, under the new title *Object-Oriented Programming with C++*. In consonance with the new title, two chapters—one explaining the concepts of object-oriented programming and the other on object-oriented software development—have been added, respectively, at the beginning and end of the book.

Substantial improvements have been effected in all chapters on C++. The book also carries a new chapter titled Standard Template Library.

The book covers the C++ language thoroughly, from basic concepts through advanced topics such as encapsulation, polymorphism, inheritance, and exception handling. It presents C++ in a pedagogically sound way, giving many program examples to highlight the features and benefits of each of its concepts.

The book is suitable for all engineering and science students including the students of computer applications for learning the C++ language from the first principles.

#### KEY FEATURES

- Logical flow of concepts starting from the preliminary topics to the major topics.
- Programs for each concept to illustrate its significance and scope.
- Complete explanation of each program with emphasis on its core segment.
- Chapter-end summary, review questions and programming exercises.
- Exhaustive glossary of programming terms.

**CONTENTS:** Preface. Object-Oriented Programming (OOP)—An Overview. C++ Language—An Overview. C++ Language—Preliminaries. Operators and Expressions. Selection. Iteration. Functions. Arrays. C—Strings. Structures and Unions. Pointers. The C++ Preprocessor. Classes and Objects. Constructors and Destructors. Operator Overloading and Type Conversions. Inheritance. I/O Streams. File Handling. String Handling. Exception Handling. Templates. New Features of C++. Standard Template Library. Object-Oriented Software Development. Appendix A: Mathematical Functions. Appendix B: Character Test Functions. Glossary. Bibliography. Index.

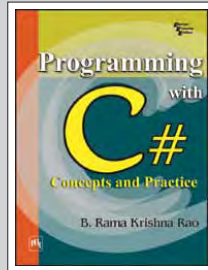
Latest Print 2014 / 704 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4462-4 / ₹ 475.00



PHI Learning: Publications

## Programming with C#: Concepts and Practice

**B. RAMA KRISHNA RAO,**  
Professor of Faculty of Informatics,  
Addis Ababa University, Addis  
Ababa, Ethiopia, United Nations  
Development Programme (UNDP).



Written in an engaging style, this book is especially designed for the beginner or intermediate level programmer to make the C# concepts accessible and exciting. The book offers a coherent approach to C# programming and focuses on the *fundamentals*—from elementary to the complex concepts of the language.

The text is thoughtfully divided into three parts. The first part provides a basic understanding of object-oriented programming, the .NET platform and its infrastructure, console and windows application programs, and the various iterative and decision making statements available in C#. The second part introduces features such as classes, objects, inheritance and polymorphism, indexers, delegates and events. The third part of the book describes the benefits of implementation of .NET assemblies, namespaces, attributes and reflections, exception handling, and threads to help students appreciate the performance issues with great clarity. The final two chapters are devoted to writing applications in Windows so that the students can build upon the knowledge gained from the book.

### KEY FEATURES

- Provides scintillating coverage of both theory and practice.
- Includes more than a hundred tested programs to develop students' proficiency with C# fundamentals.
- Offers chapter-end review questions with answers to enhance students' fundamental skills.

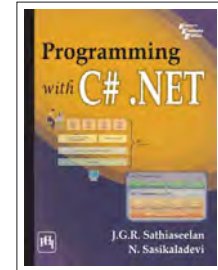
C# being one of the languages supported by Microsoft .NET Framework, this textbook will be useful to students of computer science, computer applications, information science and information technology.

**CONTENTS:** Foreword. Preface. Acknowledgements. PART I—An Overview of Object Oriented Programming (OOP). The .NET Platform. Your First C# Application. Tokens, Data Types and Expressions. Program Flow Control. PART II—Classes and Objects. Inheritance, Polymorphism and Interface. Working with C# I/O Files. Properties and Indexers. Delegates and Events. PART III—Namespaces, Assemblies and MSIL. Metadata, Attributes and Reflection. Exceptions, Threads and Compiler Directives. Introduction to Windows Forms. Adding C# Controls to Windows Forms. References. Selected Answers to Review Questions. Index.

Latest Print 2009 / 428 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3117-4 / ` 375.00

## Programming with C# .NET

**J.G.R. SATHIASEELAN** is  
Head, Department of Computer  
Science and Applications, and  
Chairman, Board of Studies,  
Bishop Heber College,  
Thiruchirappally, Tamil Nadu.



**N. SASIKALADEVI** is with the Department of Computer Science and Applications, Bishop Heber College, Thiruchirappally.

C# is the newest of Microsoft's languages that makes use of the Microsoft .NET Framework—a comprehensive set of classes that provide functionality in every aspect of the programming industry with its new object-oriented products. This book provides a step-by-step understanding of the programming concepts and theories for the beginners in .NET programming. It focuses on the Windows-based application programs, Visual programming concepts, interactive graphics fundamentals, and database connectivity concepts. The text includes topics such as Windows Forms, Windows Controls, Windows programming, data access with ADO .NET, and handling data access and data manipulation in codes.

Thoroughly practical and elaborate, the book provides deep insights into the .NET programming concepts and is designed to enhance the programming skills of the users of C#.

### KEY FEATURES

- The coverage is quite comprehensive, with more than 100 solved problems.
- All concepts are supported by plenty of tables, screen shots, and connectivity codes to make the reader comprehend the concepts better.

Intended primarily as a text for the undergraduate and postgraduate students of Computer Science and Engineering, and Electronics and Communication Engineering, this book will be extremely useful also for the students of Master/Bachelor of Computer Applications (MCA and BCA) and Information Technology. It should also prove to be helpful as a reference for software developers ranging from .NET professionals, Visual programmers, to graphic designers.

**CONTENTS:** Preface. Batch 1—Overview of .NET Framework. Windows Forms. Windows Controls—Category 1. Batch 2—Windows Controls—Category 2. Windows Controls—Category 3. Windows Controls—Category 4. Advanced Windows Programming. Batch 3—Data Access with ADO.NET. Handling Databases in Code. Handling Data Manipulation in Code.

Latest Print 2010 / 472 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3726-8 / ` 350.00



## Cloud Computing-based Projects Using Distributed Architecture (with CD-ROM)

**PRANAB KUMAR DAS GUPTA**, *Senior Scientist in Defence Research and Development Organization (DRDO). Presently he is Joint Director in Computer and Communication Wing at Proof and Experimental Establishment, Chandipur.*

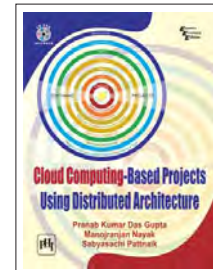
**MANOJRANJAN NAYAK**, *President and Founder of the Siksha 'O' Anusandhan University, Bhubaneswar, Odisha.*

**SABYASACHI PATNAIK**, *Professor in the Department of Information and Communication Technology at Fakir Mohan University, Balasore, Odisha.*

Development of software projects is a part of the curriculum of undergraduate and postgraduate courses. The main objective of this book is to expose the students and professionals to the latest technology, relevant theory and software development tools.

This book serves as a guide to design and develop the cloud computing-based software projects using distributed architecture. It consolidates the theory, upcoming technologies and development tools for the development of two software projects—Outstation Claim Management System (OCMS) and Retirement Benefit Calculation System (RBCS). Both the projects start with the feasibility study to understand and appreciate the problem. After understanding the problem and identifying the suitable software, hardware and network environment, the problem is formally depicted using the entity relationship model and data flow diagrams. This is followed by normalization, creation of tables and procedures. In the book, Oracle, PL/SQL, Internet Developer Suite (IDS) and .Net framework are used to develop the full-fledged GUI-based applications. The book elaborates the problem, providing logic and interface screens to design and develop the projects using any other programming language and GUI tool in which the students are comfortable with.

The book also includes a CD-ROM, which contains the source codes of OCMS and RBCS.



The book is meant for the undergraduate and postgraduate students of Computer Science, Computer Applications and Information Technology. Besides, it would also be useful to the professionals to enhance their technical skills.

After going through this book, the students/professionals will be able to:

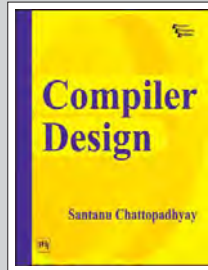
- Work on real-life projects.
- Implement the SDLC in software projects.
- Design the data flow diagrams and entity relationship diagrams.
- Use the database and normalization in software projects.
- Do the corrective, adaptive and perfective maintenance of a software.
- Learn the concepts related to IaaS, PaaS and SaaS of Cloud Computing.

**CONTENTS:** Preface. Acknowledgements. Cloud Computing and Related Concepts—An Overview. Feasibility Study and System Analysis Understanding Outstation Claim Management System (OCMS). System Design: Exploring OCMS. Coding, Testing and Implementation: OCMS Framework and Procedures. Coding, Testing and Implementation: OCMS Graphical User Interface—Basic. Coding, Testing and Implementation: OCMS Graphical User Interface—Advance. Coding, Testing and Implementation: OCMS Reports. Feasibility Study and System Analysis Understanding Retirement Benefit Calculation System (RBCS). System Design: Exploring RBCS. Coding, Testing and Implementation: RBCS Graphical User Interface—Basic. Coding, Testing and Implementation: RBCS Graphical User Interface—Advance. Software Maintenance, Documentation and Quality Management. Index.

**Latest Print 2013 / 340 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-4671-0 / ₹ 425.00**



## Compiler Design



**SANTANU CHATTOPADHYAY**, Associate Professor, Department of Electronics and Electrical Engineering, Indian Institute of Technology Kharagpur.

It introduces the readers to compilers and their design challenges and describes in detail the different phases of a compiler.

As the process of compiler designing essentially involves a number of subjects like Automata Theory, Data Structures, Algorithms, Computer Architecture, and Operating System, the contributions of these fields are also emphasized. Various types of parsers are elaborated starting with the simplest ones like recursive descent and LL to the most intricate ones like LR, canonical LR, and LALR, with special emphasis on LR parsers.

Designed primarily to serve as a text for a one-semester course in Compiler Designing for undergraduate and postgraduate students of Computer Science, this book would also be of considerable benefit to the professionals.

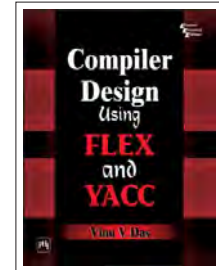
**KEY FEATURES**

- This book is comprehensive yet compact and can be covered in one semester.
- Plenty of examples and diagrams are provided to help the readers assimilate the concepts with ease.
- The exercises given in each chapter provide ample scope for practice.
- Offers insight into different optimization transformations.
- Summary at end of each chapter enables the students to recapitulate the topics easily.

**CONTENTS:** Preface. Acknowledgements. List of Figures. List of Tables. Introduction. Lexical Analysis. Syntax Analysis. Type Checking. Symbol Tables. Run-time Environment Management. Intermediate Code Generation. Target Code Generation. Code Optimization. Bibliography. Index.

**Latest Print 2013 / 244 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-2725-2 / ₹ 225.00**

## Compiler Design Using FLEX and YACC



**VINU V. DAS**, Department of Computer Science and Engineering, MES College of Engineering, Kuttippuram, Kerala.

This book is a comprehensive practical guide to the design, development, programming, and construction of compilers. It details the techniques and methods used to implement the different phases of the compiler with the help of FLEX and YACC tools. The topics in the book are systematically arranged to help students understand and write reliable programs in FLEX and YACC. The uses of these tools are amply demonstrated through more than a hundred solved programs to facilitate a thorough understanding of theoretical implementations discussed.

**KEY FEATURES**

- Discusses the theory and format of Lex specifications and describes in detail the features and options available in FLEX.
- Emphasizes the different YACC programming strategies to check the validity of the input source program.
- Includes detailed discussion on construction of different phases of compiler such as *Lexical Analyzer*, *Syntax Analyzer*, *Type Checker*, *Intermediate Code Generation*, *Symbol Table*, and *Error Recovery*.
- Discusses the *Symbol Table* implementation—considered to be the most difficult phase to implement—in an utmost simple manner with examples and illustrations.
- Emphasizes *Type Checking* phase with illustrations.

The book is primarily designed as a textbook to serve the needs of B.Tech. students in computer science and engineering as well as those of MCA students for a course in Compiler Design Lab.

**CONTENTS:** Preface. Acknowledgements. Introduction to Compiler Design. Lexical Analyzer. Programming with FLEX. Theory of FLEX. Syntax Analyzer. The YACC. Programming with YACC. Theory of YACC. Symbol Table and Type Checking. Intermediate Code Generation. Appendix A: Solutions to Selected Exercises. Appendix B: Combining YACC and FLEX. Index.

**Latest Print 2008 / 276 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-3251-5 / ₹ 225.00**





## Introduction to Automata and Compiler Design



**DASARADH RAMAIAH K.**, *Professor and Head, Department of Information Technology, Padmasri Dr. B.V. Raju Institute of Technology, Greater Hyderabad.*

This comprehensive book provides the fundamental concepts of automata and compiler design. Beginning with the basics of automata and formal languages, the book discusses the concepts of regular set and regular expression, context-free grammar and pushdown automata in detail. Then, the book explains the various compiler writing principles and simultaneously discusses the logical phases of a compiler and the environment in which they do their job. It also elaborates the concepts of syntax analysis, bottom-up parsing, syntax-directed translation, semantic analysis, optimization, and storage organization. Finally, the text concludes with a discussion on the role of code generator and its basic issues such as instruction selection, register allocation, target programs and memory management.

The book is primarily designed for one semester course in Automata and Compiler Design for undergraduate and postgraduate students of Computer Science and Information Technology. It will also be helpful to those preparing for competitive examinations like GATE, DRDO, PG CET, etc.

### KEY FEATURES

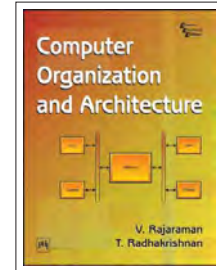
- Covers both automata and compiler design so that the readers need not have to consult two books separately.
- Includes plenty of solved problems to enable the students to assimilate the fundamental concepts.
- Provides a large number of end-of-chapter exercises and review questions as assignments and model question papers to guide the students for examinations.

**CONTENTS:** Preface. Acknowledgements. Finite Automata. Regular Set and Regular Expression. Context-Free Grammar. Pushdown Automata. Introduction to Compiler. Syntax Analysis. Bottom-up Parsing. Syntax-Directed Translation. Semantic Analysis. Optimization. Storage Organization. Code Generation. Quiz Bank. Question Bank. Model Question Papers. Bibliography. Index.

Latest Print 2011 / 396 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4234-7 / ₹ 350.00



## Computer Organization and Architecture



**V. RAJARAMAN**, *Honorary Professor, Supercomputer Education and Research Centre, Indian Institute of Science, Bangalore.*

**T. RADHAKRISHNAN**, *Professor at Concordia University, Montreal, Canada.*

Designed as an introductory text for the students of computer science, computer applications, electronics engineering and information technology for their first course on the organization and architecture of computers, this accessible, student friendly text gives a clear and in-depth analysis of the basic principles underlying the subject.

This self-contained text devotes one full chapter to the basics of digital logic. While the initial chapters describe in detail about computer organization, including CPU design, ALU design, memory design and I/O organization, the text also deals with Assembly Language Programming for Pentium using NASM assembler.

What distinguishes the text is the special attention it pays to Cache and Virtual Memory organization, as well as to RISC architecture and the intricacies of pipelining. All these discussions are climaxed by an illuminating discussion on parallel computers which shows how processors are interconnected to create a variety of parallel computers.

### KEY FEATURES

- Self-contained presentation starting with data representation and ending with advanced parallel computer architecture.
- Systematic and logical organization of topics.
- Large number of worked-out examples and exercises.
- Contains basics of assembly language programming.
- Each chapter has learning objectives and a detailed summary to help students to quickly revise the material.

**CONTENTS:** Preface. Computer Systems—A Perspective. Data Representation. Basics of Digital Systems. Arithmetic and Logic Unit-I. Arithmetic Logic Unit-II. Basic Computer Organization. Central Processing Unit. Assembly Language Level View of Computer System. Memory Organization. Cache and Virtual Memory. Input-Output Organization. Advanced Processor Architectures. Parallel Computers. Appendix A: Decision Table Terminology. Appendix B: Preparation, Programming and Developing an Assembly Language Program. References. Index.

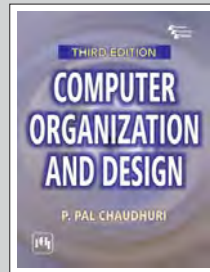
Latest Print 2011 / 508 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3200-3 / ₹ 295.00



## COMPUTER SCIENCE AND ENGINEERING

### Computer Architecture/Computer Organization

#### Computer Organization and Design, 3rd ed.



**P. PAL CHAUDHURI**, *Professor Emeritus at Cellular Automata Research Lab (CARL), a research lab established by Alumnus Software, Salt Lake, Kolkata.*

The merging of computer and communication technologies with consumer electronics has opened up new vistas for a wide variety of designs of computing systems for diverse application areas. This revised and updated third edition on Computer Organization and Design strives to make the students keep pace with the changes, both in technology and pedagogy in the fast growing discipline of computer science and engineering. The basic principles of how the intended behaviour of complex functions can be realized with the interconnected network of digital blocks are explained in an easy-to-understand style.

#### WHAT IS NEW TO THIS EDITION

- Includes a new chapter on Computer Networking, Internet, and Wireless Networks.
- Introduces topics such as wireless input-output devices, RAID technology built around disk arrays, USB, SCSI, etc.

#### KEY FEATURES

- Provides a large number of design problems and their solutions in each chapter.
- Presents state-of-the-art memory technology which includes EEPROM and Flash Memory apart from Main Storage, Cache, Virtual Memory, Associative Memory, Magnetic Bubble, and Charged Couple Device.
- Shows how the basic data types and data structures are supported in hardware.

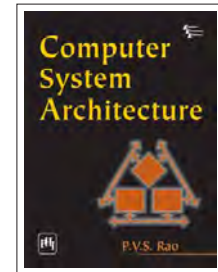
Besides students, practising engineers should find reading this design-oriented text both useful and rewarding.

**CONTENTS:** Preface. Preface to the First Edition. Acknowledgements. Evolution of Computer Systems. Computer System Design: Hierarchical Levels. Information Representation. Central Processing Unit (CPU). Controller Design. Memory Subsystem. Secondary Storage. Input-Output Devices. Input-Output Processing. Computer System Architecture. Computer Networking, Internet, and Wireless Networks. Bibliography. Index.



Latest Print 2014 / 916 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3511-0 / ₹ 595.00

#### Computer System Architecture



**P.V.S. RAO**, *Formerly, Senior Professor and Head of the Computer Systems and Communications Group, Tata Institute of Fundamental Research (TIFR), Mumbai, is currently Adviser to Satyam Global Lifenet, Hyderabad.*

Intended as a text for undergraduate and postgraduate students of engineering in Computer Science and Engineering, Information Technology, and students pursuing courses in computer applications (BCA/MCA) and computer science (B.Sc./M.Sc.), this state-of-the-art study acquaints the students with concepts and implementations in computer architectures. Though a new title, it is a completely reorganized, thoroughly revised and fully updated version of the author's earlier book *Perspectives in Computer Architecture*.

The text begins with a brief account of the very early history of computers and describes the von Neumann IAS type of computers; then it goes on to give a brief introduction to the subsequent advances in computer systems covering device technologies, operational aspects, system organization and applications. This is followed by an analysis of the advances and innovations that have taken place in these areas. Advanced concepts such as look-ahead, pipelining, RISC architectures, and multi-programming are fully analyzed. The text concludes with a discussion on such topical subjects as computer networks, microprocessors and micro-computers, microprocessor families, Intel Pentium series, and newer high-power processors.

Besides students, practising engineers should also find this book to be of immense value to them.

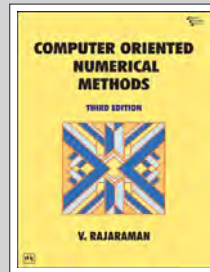
**CONTENTS:** Preface. Stored Program Computers. The Basic Building Blocks of Digital Computers. The Arithmetic Unit. The Memory Unit. Input and Output Units. The Control Unit. Innovations in Arithmetic Units. Advances in Memory Systems. Innovations in Input and Output Units. Innovations in General Organisation and Control. Interrupts and Interrupt Operation. Look Ahead and Pipelining. Trends in System Architecture. Multi-programming and Time-Sharing. External and Internal Concurrency. Vector Processors, Array Processors and Supercomputers. Computer Networks. Microprocessors and Microcomputers. Microprocessor Families. The Pentium Series of Processors. The Newer High Power Processors. Appendices— 1. Representation of Numbers in Computers. 2. Arithmetic Operations in Digital Computers. 3. Generations of Computers. 4. Machine Language and Assembly. 5. Data Flow. Index.

Latest Print 2011 / 520 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3594-3 / ₹ 325.00

## COMPUTER SCIENCE AND ENGINEERING

### Computer Oriented Numerical Methods

#### Computer Oriented Numerical Methods, 3rd ed.



**V. RAJARAMAN**, *Honorary Professor, Supercomputer Education and Research Centre, Indian Institute of Science, Bangalore.*

This book is a concise presentation of the basic concepts used in evolving numerical methods with special emphasis on developing computational algorithms for solving problems in algebra and calculus on a computer.

It is written for undergraduate science and engineering students who have taken a first course in differential and integral calculus. The approach is to ensure conceptual understanding of the numerical methods by relying on students' geometric intuition.

The book provides coverage of iterative methods for solving algebraic and transcendental equations, direct and iterative methods of solving simultaneous algebraic equations, numerical methods for differentiation and integration, and solution of ordinary differential equations with initial conditions.

The formulation of algorithms is illustrated with a number of solved examples and an algorithmic language based on English (and similar to PASCAL) is used to express the logic of the numerical procedures. This approach is thus different from that used in most books which either use a programming language like FORTRAN or use flow charts to express algorithms.

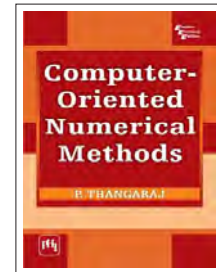
The solutions to selected problems have been provided at the end of the book.

**CONTENTS:** Preface to the Third Edition. Computational Algorithms. Computer Arithmetic. Iterative Methods. Solution of Simultaneous Algebraic Equations. Interpolation. Least Squares Approximation of Functions. Approximation of Functions. Differentiation and Integration. Numerical Solution of Differential Equations. Solutions to Selected Exercises. Index.

Latest Print 2013 / 208 pp. / 15.3 × 22.9 cm  
ISBN-978-81-203-0786-5 / ` 150.00



#### Computer-Oriented Numerical Methods



**P. THANGARAJ**, *Professor and Head, Department of Computer Science and Engineering, Bannari Amman Institute of Technology, Sathyamangalam.*

Numerical methods are powerful problem-solving tools. Techniques of these methods are capable of handling large systems of equations, nonlinearities and complicated geometries in engineering practice which are impossible to be solved analytically. Numerical methods can solve the real world problem using the C program given in this book.

This well-written text explores the basic concepts of numerical methods and gives computational algorithms, flow charts and programs for solving nonlinear algebraic equations, linear equations, curve fitting, integration, differentiation and differential equations.

The book is intended for students of B.E. and B.Tech as well as for students of B.Sc. (Mathematics and Physics).

#### KEY FEATURES

- Gives clear and precise exposition of modern numerical methods.
- Provides mathematical derivation for each method to build the student's understanding of numerical analysis.
- Presents C programs for each method to help students to implement the method in a programming language.
- Includes several solved examples to illustrate the concepts.
- Contains exercises with answers for practice.

**CONTENTS:** List of Algorithms. List of Flow Charts. List of Programs. Preface. Numerical Solution of Algebraic and Transcendental Equations. Simultaneous Linear Non-Homogeneous Algebraic Equations. Iterative Method for Eigenvalues. Interpolation. Numerical Differentiation and Numerical Integration. Difference Equations. Numerical Solution of Ordinary Differential Equations. 8. Boundary Value Problems. Index.

Latest Print 2013 / 608 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-3539-4 / ` 350.00



## COMPUTER SCIENCE AND ENGINEERING

### Computer Oriented Numerical Methods

#### Computer Oriented Numerical and Statistical Methods



**SANT SHARAN MISHRA**, Reader, Department of Mathematics and Statistics at Dr. Ram Manohar Lohia Avadh University, Faizabad.

This comprehensive text provides a thorough understanding of mathematical concepts and their applications with special emphasis on computational algorithms. The book gives a detailed discussion on all the relevant topics of both numerical and statistical methods, which are nowadays very important at computing level. It also includes the basic issues related to theory of estimation and testing of hypothesis, various sampling tests, and analysis of variance with plenty of illustrations. The topics covered in this book are supported by a large number of worked-out examples, C programs and algorithms to facilitate clear understanding of various theories discussed on numerical and statistical methods.

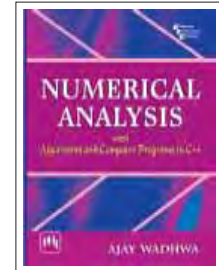
The text is intended for the undergraduate students of computer engineering and postgraduate students of computer applications.

**CONTENTS:** Preface. Computer Arithmetic. Algebraic and Transcendental Equations. Solution of Simultaneous Linear Algebraic Equations. Interpolation. Numerical Differentiation and Integration. Numerical Solution of Ordinary Differential Equations. Curve Fitting. Time Series, Forecasting and Quality Control. Statistics, Data and Frequency. Measures of Central Tendency and Dispersion. Correlation and Regression Analysis. Control Structures. Theory of Estimation and Testing of Hypothesis. Small Sampling and Analysis of Variance. Appendix. Index.



Latest Print 2013 / 512 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4780-9 / ` 395.00

#### Numerical Analysis with Algorithms and Computer Programs in C++



**AJAY WADHWA**, Associate Professor of Physics at Sri Guru Tegh Bahadur Khalsa College, University of Delhi.

This concise introduction to *Numerical Methods* blends the traditional algebraic approach with the computer-based approach, with special emphasis on evolving algorithms which have been directly transformed into programs in C++. Each numerical method used for solving nonlinear algebraic equations, simultaneous linear equations, differentiation, integration, ordinary differential equations, curve-fitting, etc. is accompanied by an algorithm and the corresponding computer program.

All computer programs have been test run on Linux 'Ubuntu C++' as well as Window-based 'Dev C++', Visual C++ and 'Turbo C++' compiler systems. Since different types of C++ compilers are in use today, instructions have been given with each computer program to run it on any kind of compiler. To this effect, an introductory chapter on C++ compilers has been added for ready reference by the students and teachers.

Another major feature of the book is the coverage of the practicals prescribed for laboratory work in Numerical Analysis. Each chapter has a large number of laboratory tested programming examples and exercises including questions from previous years' examinations.

This textbook is intended for the undergraduate science students pursuing courses in BSc (Hons.) Physics, BSc (Hons.) Electronics and BSc (Hons.) Mathematics. It is also suitable for courses on Numerical Analysis prescribed for the engineering students of all disciplines.

**CONTENTS:** Preface. A Note on C++ Compilers. Estimation of Errors in Computation. Numerical Methods for Non-Linear and Transcendental Equations. Solution of Simultaneous Linear Equations. Interpolation. Numerical Differentiation. Numerical Integration. Numerical Solution of Ordinary Differential Equations. Curve Fitting. Index.

Latest Print 2012 / 200 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-4545-4 / ` 195.00

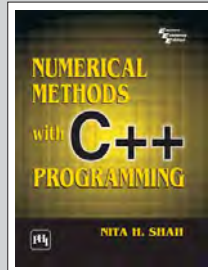


## COMPUTER SCIENCE AND ENGINEERING

### Computer Oriented Numerical Methods

#### Numerical Methods with C++ Programming

**NITA H. SHAH**, Reader in the  
Department of Mathematics,  
Gujarat University.



The rapid development of high speed digital computers and the increasing desire for numerical answers to applied problems have led to increased demands in the courses dealing with the methods and techniques of numerical analysis. Numerical methods have always been useful but their role in the present-day scientific research has become prominent. For example, they enable one to find the roots of transcendental equations and in solving nonlinear differential equations. Indeed, they give the solution when ordinary analytical methods fail.

This well-organized and comprehensive text aims at enhancing and strengthening numerical methods concepts among students using C++ programming, a fast emerging preferred programming language among software developers. The book provides a synthesis of both theory and practice. It focuses on the core areas of numerical analysis including algebraic equations, interpolation, boundary value problem, and matrix eigenvalue problems. The mathematical concepts are supported by a number of solved examples. Extensive self-review exercises and answers are provided at the end of each chapter to help students review and reinforce the key concepts.

#### KEY FEATURES

- C++ programs are provided for all numerical methods discussed.
- More than 400 unsolved problems and 200 solved problems are included to help students test their grasp of the subject.

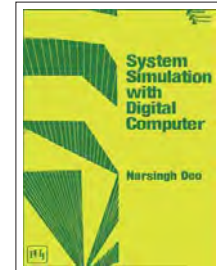
The book is intended for undergraduate and postgraduate students of Mathematics, Engineering and Statistics. Besides, students pursuing BCA and MCA and having Numerical Methods with C++ Programming as a subject in their course will benefit from this book.

**CONTENTS:** Preface. Theory of Equations. Roots of Algebraic and Transcendental Equations. Solution of Simultaneous Linear Algebraic Equations. Curve Fitting. Interpolation. Numerical Differentiation and Integration. Numerical Solution of Ordinary Differential Equations. Numerical Solution of Partial Differential Equations. Index.

**Latest Print 2009 / 324 pp. / 16.0 × 24.1 cm**  
**ISBN-978-81-203-3596-7 / ₹ 275.00**

### Computer Simulation

#### System Simulation with Digital Computer



**NARSINGH DEO**, Charles E. Millican Professor, Department  
of Computer Science, University of Central Florida.

This is a compact and basic textbook for a first course in simulation, designed to provide a thorough grounding in the use of simulation techniques to solve simple, but mathematically intractable problems for studying the discipline of digital computer simulation. The purpose of the book is to get the reader started. Designed for students of engineering and business administration as well as for practising systems analysts, industrial engineers and operations research workers, it describes the use of digital computers for simulating engineering and business systems.

The book presents a complete overview of simulation of discrete, stochastic, dynamic systems with emphasis on simulation of continuous systems. It also provides indepth examples of simulation from three very important areas of problems, namely queuing systems, stochastic networks, and inventory systems.

Techniques of simulation are thus highlighted through examples which encourage learning by doing, by solving a large variety of actual problems, and by watching how others solve them.

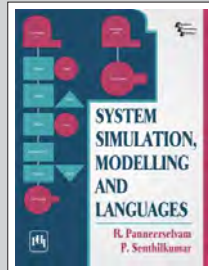
**CONTENTS:** Preface. Acknowledgements. Introduction. Simulation of Continuous Systems. Discrete System Simulation. Simulation of Queueing Systems. Simulation of a PERT Network. Inventory Control and Forecasting. Design and Evaluation of Simulation Experiments. Simulation Languages. Index.

**Latest Print 2013 / 216 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-0028-6 / ₹ 175.00**



## System Simulation, Modelling and Languages

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



**P. SENTHILKUMAR**, *Manager, Programme Management, Ashok Leyland, Chennai.*

Designed as a text for undergraduate students (B.Tech./B.E.) of Computer Science and Engineering and IT, Mechanical Engineering and Mechatronics Engineering, and post-graduate students (M.Tech./M.E., M.Sc.) of Computer Science and Engineering and IT and Industrial Engineering, as well as for Bachelor and Master of Computer Applications (BCA/MCA), this well-organized book gives an in-depth analysis of the concepts of system simulation modelling and simulation languages. The book provides detailed discussions on the fundamental and advanced concepts of simulation.

The book begins with the concept of system and the different terminologies associated with the system. Then it presents the different methods of random number generation and their tests. Besides, the text dwells on different probability distributions and their random variates, which are used in the simulation model, and describes various simulation languages such as GPSS, Simula I, SIMSCRIPT, CSL, GASP, OPS-3, DYNAMO, SIMAN and SLAM II. Further, it gives a comprehensive coverage of different queueing systems with illustrative examples as well as the logics of simulation model for both single-server and parallel-server queueing systems. The concluding chapters deal extensively with GPSS language, Arena simulation software and ProModel simulation software.

### KEY FEATURES

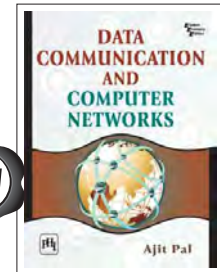
- Follows a step-by-step approach to derive the test results.
- Gives a large number of **solved examples** and well-designed **chapter-end questions**.
- Includes several real-life **Case Studies** to illustrate the concepts discussed.

**CONTENTS:** Preface. System Concept. Introduction to Simulation. Methods of Random Number Generation and Their Tests. Probability Distributions and Random Variates. Introduction to Simulation Languages. Queueing Theory. Simulation Using High-Level Languages. General-Purpose Simulation System (Section 1). General-Purpose Simulation System (Section 2). General-Purpose Simulation System (Section 3). Simula Language. SIMSCRIPT III Language. SIMAN Language. SLAM II (Simulation Language for Alternative Modelling). Arena Simulation Software. ProModel Simulation Software. Appendixes. References. Further Reading. Index.



Latest Print 2013 / 444 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4706-9 / ` 375.00

## Data Communication and Computer Networks



**AJIT PAL**, *Professor, Department of Computer Science and Engineering, Indian Institute of Technology Kharagpur.*

Intended primarily as a textbook for the students of computer science and engineering, electronics and communication engineering, master of computer applications (MCA), and those offering IT courses, the book provides a comprehensive coverage of the subject. Basic elements of communication such as data, signal and channel alongwith their characteristics such as bandwidth, bit internal and bit rate have been explained.

Contents related to guided and unguided transmission media, Bluetooth wireless technology, developed for Personal Area Network (PAN) and issues related to routing covering popular routing algorithms namely RIP, OSPF and BGP, have been introduced in the book.

Various aspects of data link control alongwith their application in HDLC network and techniques such as encoding, multiplexing and encryption/decryption are presented in detail. Characteristics and implementation of PSTN, SONET, ATM, LAN, PACKET RADIO network, Cellular telephone network and Satellite network have also been explained. Different aspects of IEEE 802.11 WLAN and congestion control protocols have also been discussed in the book.

**CONTENTS:** Preface. Introduction. Data Communication Fundamentals. Data Link Control. Switched Communication Networks. Local Area Networks. High Speed LANs. Wireless Networks. Internetworking. Routing and Congestion Control. Network Security. Q-A Manual. References. Index.

Latest Print 2014 / 352 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4845-5 / ` 395.00

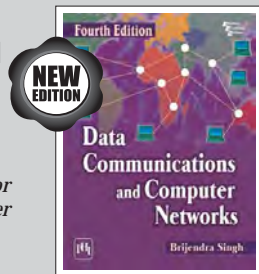


## COMPUTER SCIENCE AND ENGINEERING

### Data and Computer Communications

#### Data Communications and Computer Networks, 4th ed.

**BRIJENDRA SINGH**, *Professor and Head, Department of Computer Science, University of Lucknow.*



This fully revised and updated book, now in its Fourth Edition, continues to provide a comprehensive coverage of data communications and computer networks in an easy to understand style. The text places as much emphasis on the application of the concepts as on the concepts themselves. While the theoretical part is intended to offer a solid foundation of the basics so as to equip the student for further study, the stress on the applications is meant to acquaint the student with the realistic status of data communications and computer networks as of now.

Intended primarily as a textbook for the students of computer science and engineering, electronics and communication engineering, master of computer applications (MCA), and those offering IT courses, this book would also be useful for practising professionals.

#### NEW TO THIS EDITION

- Three new chapters on:
  - Network Architecture and OSI Model
  - Wireless Communication Technologies
  - Web Security
- Appendix on Binary and Hexadecimal Numbering

#### KEY FEATURES

- Illustrates the application of the principles through highly simplified block diagrams.
- Contains a comprehensive glossary which gives simple and accurate descriptions of various terms.
- Provides Questions and Answers at the end of the book which facilitate quick revision of the concept.

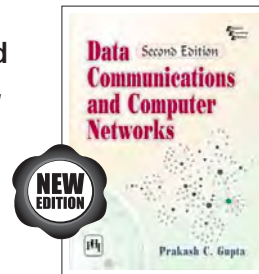
**CONTENTS:** Preface. Preface to the First Edition. Introduction. Network Architecture and OSI Model. Communication Media and Data Transmission. Error Detection and Correction. Data Compression. Data Link Control and Protocol Concepts. Local Area Networks. Wide Area Networks. Integrated Services and Routing Protocols. Wireless LANs. Wireless Communication Technologies. Internetworking. TCP Reliable Transport Service. Network Applications. Network Management. Network Security. Web Security. Appendices—1: ASCII Code. 2: Binary and Hexadecimal Numbering. 3: Abbreviations and Acronyms. 4: Questions and Answers on Networking. 5: Contact Addresses for Various Organizations. Glossary of Terms. Bibliography. Index.

Latest Print 2014 / 480 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4907-0 / ₹ 395.00



#### Data Communications and Computer Networks, 2nd ed.

**PRAKASH C. GUPTA**, *Head, Department of Information Technology, Maharashtra Institute of Technology, Pune.*



Primarily intended as a text for undergraduate courses in Electronics and Communications Engineering, Computer Science, IT courses, and Computer Applications, this up-to-date and accessible text gives an indepth analysis of data communications and computer networks in an easy-to-read style. Though a new title, it is a completely revised and fully updated version of the author's earlier book *Data Communications*. The rapid strides made during the last decade in the fields of data communication and networking, and the close link between these two subjects have prompted the author to add several chapters on computer networks in this text.

The book gives a masterly analysis of topics ranging from the principles of data transmission to computer networking applications. It also provides standard protocols, thereby enabling to bridge the gap between theory and practice. What's more, it correlates the network protocols to the concepts, which are explained with the help of **numerous examples** to facilitate students' understanding of the subject.

This well-organized text presents the **latest developments** in the field and details **current topics** of interest such as Multicasting, MPLS, IPv6, Gigabit Ethernet, IPsec, SSL, Auto-negotiation, Wireless LANs, Network security, Differentiated services, and ADSL.

Besides students, the practicing professionals would find the book to be a valuable resource.

The book, in its second edition introduces a full chapter on *Quality of Service*, highlighting the meaning, parameters and functions required for quality of service.

**CONTENTS:** Preface. Data Communication Concepts and Terminology. Transmission Media. Telephone Network. Data Line Devices. Error Control. Network Architecture.. The Physical Layer. The Data Link Layer. Data Link Protocols. Local Area Networks. IEEE 802.3 Ethernet. Token Passing Local Area Networks. Wireless Local Area Networks. Bridges and Layer-2 Switches. Network Layer. Virtual Circuit Packet Switching Network. Internet Protocol (IP). Routing Protocols. Multicasting and Multiprotocol Label Switching (MPLS). Transport Layer. Network Security. Application Layer. Quality of Service. Bibliography. Answers to Selected Exercises. List of Acronyms. Index.

Latest Print 2014 / 876 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4864-6 / ₹ 495.00



### Data Mining: Techniques and Trends



**N.P. GOPALAN**, Professor, Department of Computer Applications, National Institute of Technology, Tiruchirapalli.  
**B. SIVASELVAN**, Assistant Professor, Indian Institute of Information Technology, Design and Manufacturing, Kancheepuram, IIT Madras Campus, Chennai.

In today's world of competitive business environment, there is a driving need to extract hidden and potentially meaningful information from large databases for effective decision making. This compact book explores the concept of data mining and discusses various data mining techniques and their applications. It is primarily designed for the students of Computer Science and Engineering, Information Technology, Computer Applications, and Management.

Written in a student-friendly style, the book describes the various phases of data mining, architecture of a data mining system, and the types of knowledge that can be mined from databases. It elaborates on different data preprocessing techniques such as cleaning, integration, transformation and reduction. The text then explains the various data mining techniques such as association rule mining, data classification and clustering. The book adopts an algorithm-centric approach presenting various algorithms for these data mining techniques. Finally, the text ends with an exhaustive discussion on multimedia data mining (MDM).

#### KEY FEATURES

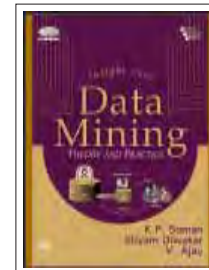
- Illustrates the concepts with the help of various figures and examples.
- Provides a summary at the end of each chapter for quick revision of key points.
- Offers chapter-end questions for self-evaluation.

**CONTENTS:** Preface. Introduction to Data Mining. Data Preprocessing Technique. Association Rule Mining. Data Classification Techniques. Data Clustering. Other Data Mining Techniques. Multimedia Data Mining: The Recent Trend. Index.



Latest Print 2009 / 144 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-3812-8 / ₹ 125.00

### Insight into Data Mining: Theory and Practice (with CD-ROM)



**K.P. SOMAN**, Head, Centre for Excellence in Computational Engineering and Networking, Amrita Vishwa Vidyapeetham, Coimbatore.

**SHYAM DIWAKAR**, School of Biotechnology, Amrita Vishwa Vidyapeetham (Amrita University), Kollam, Kerala.

**V. AJAY**, Research Associate at Centre for Excellence in Computational Engineering and Networking, Amrita Vishwa Vidyapeetham, Coimbatore.

Data Mining is an emerging technology that has made its way into science, engineering, commerce and industry as many existing inference methods are obsolete for dealing with massive datasets that get accumulated in data warehouses.

This comprehensive and up-to-date text aims at providing the reader with sufficient information about data mining methods and algorithms so that they can make use of these methods for solving real-world problems. The authors have taken care to include most of the widely used methods in data mining with simple examples so as to make the text ideal for classroom learning. To make the theory more comprehensible to the students, many illustrations have been used, and this in turn explains how certain parameters of interest change as the algorithm proceeds.

Designed as a textbook for the undergraduate and postgraduate students of computer science, information technology, and master of computer applications, the book can also be used for MBA courses in Data Mining in Business, Business Intelligence, Marketing Research, and Health Care Management. Students of Bioinformatics will also find the text extremely useful.



**CD-ROM INCLUDED:** The accompanying CD contains

- Large collection of datasets.
- Animation on how to use WEKA and ExcelMiner to do data mining.

**CONTENTS:** Preface. Acknowledgements. Data Mining. Data Mining from a Business Perspective. Data Types, Input and Output of Data Mining Algorithms. Decision Trees—Classification and Regression Trees. Preprocessing and Postprocessing in Data Mining. DataSets. Association Rule Mining. Machine Learning with Open Source and Commercial Software. Algorithms for Classification and Regression. Support Vector Machines. Cluster Analysis. Visualization of Multidimensional Data. Appendices. Index.

Latest Print 2012 / 420 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2897-6 / ₹ 375.00



## Introduction to Data Mining with Case Studies, 3rd ed.



**G.K. GUPTA**, Adjunct Professor of Computer Science at Monash University, Clayton, Australia. Professor Gupta is a Fellow of the Association of Computing Machinery (ACM), a Fellow of the Australian Computer Society (ACS) and a Senior Member of the IEEE.

The field of data mining provides techniques for automated discovery of valuable information from the accumulated data of computerized operations of enterprises. This book offers a clear and comprehensive introduction to both data mining theory and practice. It is written primarily as a textbook for the students of computer science, management, computer applications, and information technology.

The book ensures that the students learn the major data mining techniques even if they do not have a strong mathematical background. The techniques include data pre-processing, association rule mining, supervised classification, cluster analysis, web data mining, search engine query mining, data warehousing and OLAP. To enhance the understanding of the concepts introduced, and to show how the techniques described in the book are used in practice, each chapter is followed by one or two case studies that have been published in scholarly journals. Most case studies deal with real business problems (for example, marketing, e-commerce, CRM). Studying the case studies provides the reader with a greater insight into the data mining techniques.

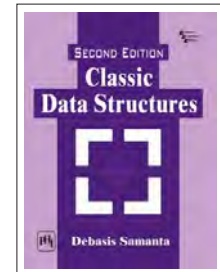
The book also provides many examples, review questions, multiple choice questions, chapter-end exercises and a good list of references and Web resources especially those which are easy to understand and useful for students. A number of class projects have also been included.

**CONTENTS:** Preface. Preface to the Second Edition. Preface to the First Edition. Introduction. Data understanding and Data Preparation. Association Rules Mining. Classification. Cluster Analysis. Web Data Mining. Search Engines and Query Mining. Data Warehousing. Online Analytical Processing (OLAP). Information Privacy and Data Mining. Answers to Multiple Choice Questions. Index



Latest Print 2014 / 536 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-5002-1 / 495.00

## Classic Data Structures, 2nd ed. (with CD-ROM)



**D. SAMANTA**, Associate Professor at the School of Information Technology, Indian Institute of Technology Kharagpur.

This book is the **second edition** of a text designed for undergraduate engineering courses in Data Structures. The treatment of the subject in this second edition maintains the same general philosophy as in the first edition but with significant additions. These changes are designed to improve the readability and understandability of all algorithms so that the students acquire a firm grasp of the key concepts.

The book provides a complete picture of all important data structures used in modern programming practice. It shows:

- various ways of representing a data structure
- different operations to manage a data structure
- several applications of a data structure

The algorithms are presented in English-like constructs for ease of comprehension by students, though all of them have been implemented in C language to test their correctness.

**KEY FEATURES**

- Red-black tree and spray tree are discussed in detail
- Includes a new chapter on **Sorting**
- Includes a new chapter on **Searching**
- Includes a new appendix on Mathematical Background
- Includes a new appendix on Analysis of Algorithms for those who may be unfamiliar with the concepts of algorithms
- Includes a new appendix on selected GATE questions
- Provides numerous section-wise assignments in each chapter
- Also included are exercises—Problems to Ponder—in each chapter to enhance learning

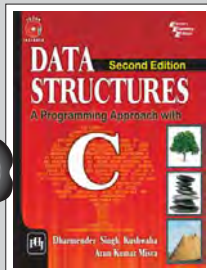
The book is suitable for students of (i) computer science, (ii) computer applications, (iii) information and communication technology (ICT), and (iv) computer science and engineering.

**CONTENTS:** Preface. Preface to the First Edition. Introduction and Overview. Arrays. Linked Lists. Stacks. Queues. Tables. Trees. Graphs. Sets. Sorting. Searching. Appendix A: Analysis of Algorithms. Index.

Latest Print 2014 / 824 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3731-2 / 495.00



### Data Structures: A Programming Approach with C, 2nd ed.



**DHARMENDER SINGH KUSHWAHA**, Associate Professor, Department of Computer Science & Engineering, Motilal Nehru National Institute of Technology (MNNIT) Allahabad.

**ARUN KUMAR MISRA**, Professor, Department of Computer Science & Engineering, MNNIT Allahabad.

This well-organized book, now in its second edition, discusses the fundamentals of various data structures using C as the programming language. Beginning with the basics of C, the discussion moves on to describe Pointers, Arrays, Linked lists, Stacks, Queues, Trees, Heaps, Graphs, Files, Hashing, and so on that form the base of data structure. It builds up the concept of Pointers in a lucid manner with suitable examples, which forms the crux of Data Structures. Besides updated text and additional multiple choice questions, the new edition deals with various classical problems such as 8-queens problem, towers of Hanoi, minesweeper, lift problem, tic-tac-toe and Knapsack problem, which will help students understand how the real-life problems can be solved by using data structures. The book exhaustively covers all important topics prescribed in the syllabi of Indian universities/institutes, including all the Technical Universities and NITs.

Primarily intended as a text for the undergraduate students of Engineering (Computer Science/Information Technology) and postgraduate students of Computer Application (MCA) and Computer Science (M.Sc.), the book will also be of immense use to professionals engaged in the field of computer science and information technology.

#### KEY FEATURES

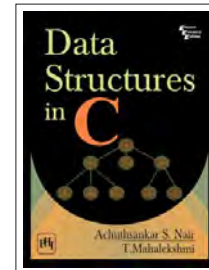
- Provides more than 160 complete programs for better understanding.
- Includes over 470 MCQs to cater to the syllabus needs of GATE and other competitive exams.
- Contains over 500 figures to explain various algorithms and concepts.
- Contains solved examples and programs for practice.
- Provides companion CD containing additional programs for students' use.

**CONTENTS:** Preface. A Quick Overview of C Fundamentals. Introduction to Data Structure. Understanding Pointers in C. Recursion. Arrays. Linked List. Sorting. Strings. Stacks. Queues. Trees. Advanced Topics in Trees. Heap Data Structure. Graphs. Files. Hashing. Data Structure Projects. Index.



Latest Print 2014 / 728 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-5029-8 / ₹ 495.00

### Data Structures in C



**ACHUTHSANKAR S. NAIR**, Honorary Director, Centre for Bioinformatics, University of Kerala, Thiruvanthapuram.

**T. MAHALEKSHMI**, Principal, Sree Narayana Institute of Technology, Vadakevitta, Kollam, Kerala.

This compact and student-friendly book deals with data structures, particularly user defined data structures, such as linked lists, stacks, queues, trees, graphs and files, using C as the programming language. The text begins with an introduction to the most common concepts of C and then it goes on to give a detailed discussion on the processing of one-dimensional and two-dimensional arrays, their internal organization, and handling arrays using pointers. Besides, it dwells on the dynamic linked list and its variations such as doubly linked lists and circular linked lists, with the help of memory diagrams. The text delineates the static and dynamic implementations of stacks and queues, the application, implementation, and construction of binary trees, and representation of graphs and graph traversal. The book concludes with a discussion on the various types of searching and sorting techniques, with the help of visual examples.

#### KEY FEATURES

- Provides visualization model for abstract concepts.
- Presents the shortest possible program.
- Provides conceptual exercises before programming examples.

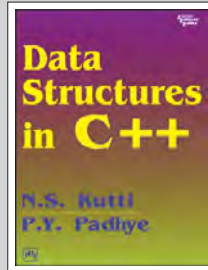
The book is intended for the undergraduate students of Engineering (Computer Science/Information Technology), and undergraduate and postgraduate students of Computer Applications, Computer Science and Information Technology.

**CONTENTS:** Preface. Acknowledgements. Overview. Arrays. Linked List. Stacks and Queues. Binary Trees. Graphs. Searching, Sorting and Files. Appendix: ASCII Table. Index.

Latest Print 2011 / 296 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3642-1 / ₹ 250.00



## Data Structures in C++



**N.S. KUTTI**, Associate Professor, Department of Computer Science, Sultan Qaboos University, Oman.

**P.Y. PADHYE**, Dr. Ing., (Dresden), Melbourne Institute of Business Technology, Melbourne.

This compact and comprehensive book provides an introduction to data structures from an object-oriented perspective using the powerful language C++ as the programming vehicle. It is designed as an ideal text for the students before they start designing algorithms in C++.

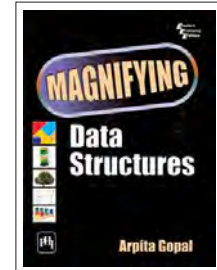
The book begins with an overview of C++, then it goes on to analyze the basic concepts of data structures, and finally focusses the reader's attention on abstract data structures. In so doing, the text uses simple examples to explain the meaning of each data type. Throughout, an attempt has been made to enable students to progress gradually from simple object-oriented abstract data structures to more advanced data structures. A large number of worked examples and the end-of-chapter exercises help the students reinforce the knowledge gained.

Intended as a one-semester course for undergraduate students in computer science and for those who offer this course in engineering and management, the book should also prove highly useful to those IT professionals who have a keen interest in the subject.

**CONTENTS:** Preface. Introduction. Data Types. Starting with Abstract Data Types. Arrays. Strings. Linked Lists. Stacks. Queues. Trees. Graphs. Bibliography. Index.

**Latest Print 2011 / 216 pp. / 16.0 × 24.1 cm**  
**ISBN-978-81-203-1443-6 / ₹ 150.00**

## Magnifying Data Structures



**ARPITA GOPAL**, Director-MCA at Sinhgad Institute of Business Administration and Research, Pune.

This book, the second of the *Magnifying Series*, provides a comprehensive account of the various methods and techniques of representing data structures. It presents all the important data structures used in system programming and application programming along with their definitions, operations, implementation and applications.

The book first introduces the students to basic programming concepts to help them build a strong foundation for understanding data structures. It then explains the mathematical and logical aspects of data in the form of abstract data types. Several types of data structures such as arrays, stacks, queues, linked list and trees are discussed with a diagrammatic approach. The text also deals with threading of a tree, AVL tree, M-ary tree as well as graphs. In addition, different common sorting and searching algorithms are discussed.

### KEY FEATURES

- Explains the process of abstraction using the C language.
- Presents step-by-step analysis and development of algorithms to implement various data structures.
- Develops building blocks for design of complex programs.
- Provides a number of worked-out examples to illustrate the concepts.
- Includes chapter-end exercises for practice.

The text is designed for the students of computer applications (BCA/MCA), computer science (BSc/MSc), computer science and engineering and information communication technology (BE/B.Tech.) and also for the students of other engineering disciplines.

**CONTENTS:** Preface. Acknowledgements. Programming Concepts. Arrays and Structures. ADT Array. ADT Stack. ADT Queue. ADT Linked List. ADT Tree. Advance Trees. ADT Graphs. Sorting Searching and Algorithm Complexity. Index.

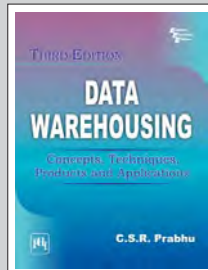
**Latest Print 2010 / 456 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-4019-0 / ₹ 325.00**



## COMPUTER SCIENCE AND ENGINEERING

### Data Warehousing

**Data Warehousing: Concepts, Techniques, Products and Applications, 3rd ed.**



**C.S.R. PRABHU**, Deputy Director General, National Informatics Centre (NIC), Hyderabad.

The Third Edition of this well-received text analyzes the fundamental concepts of data warehousing, data marts, and OLAP. The author discusses, in an easy-to-understand language, important topics such as data mining, how to build a data warehouse, and potential applications of data warehousing technology in government. Besides, the text compares and contrasts the currently available software tools used to design and develop data warehouses. The book is a blend of the principles and real-life case studies. While retaining the six existing case studies, it gives four new case studies:

- HARBOR, A Highly Available Data Warehouse
- A Typical Business Data Warehouse for a Trading Company
- Customer Data Warehouse for the First and Largest Online Bank in the United Kingdom
- A German Supermarket EDEKA'S Data Warehouse

The book, which is a blend of principles and real-life case studies, as a text is intended for students of B.Tech/M.Tech (Computer Science and Engineering), B.Tech/M.Tech (Information Technology), MBA, M.Sc. (Computer Science), M.Sc. (Information Technology), and MCA. It should also be of considerable utility and worth to software professionals and database practitioners.

**CONTENTS:** Preface. Acknowledgements. Data Warehousing: An Introduction. Online Analytical Processing. Data Mining. Developing a Data Warehouse. Applications of Data Warehousing and Data Mining in Government. CASE STUDIES—1. Data Warehousing in the Tamil Nadu Government. 2. Data Warehouse for the Ministry of Commerce. 3. Data Warehouse for the Government of Andhra Pradesh. 4. Data Warehousing in Hewlett-Packard. 5. Data Warehousing in Lavis Strauss. 6. Data Warehousing in the World Bank. 7. HARBOR, A Highly Available Data Warehouse. 8. A Typical Business Data Warehouse for a Trading Company. 9. Customer Data Warehouse of the World's First and Largest Online Bank in the United Kingdom. 10. A German Supermarket EDEKA's Data Warehouse. Bibliography. Index.

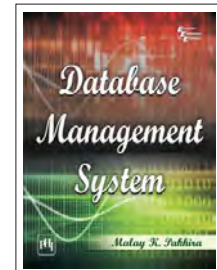


Latest Print 2013 / 184 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3627-8 / ₹ 225.00

PHI Learning: Publications

### Database Management Systems

**Database Management System**



**MALAY K. PAKHIRA**, Associate Professor in the Department of Computer Science and Engineering at Kalyani Government Engineering College, West Bengal.

This compact text on Database Management System is a perfect blend of theoretical and practical aspects. From basics to applications, it provides a thorough and up-to-date treatment of the subject. The book, in the beginning, builds a strong foundation of relational database management system and then deals with query language, data manipulation, transaction processing, data warehouse, data mining, and application programming. The text is supported by clear illustrations, sufficient figures and tables, and necessary theoretical details to understand the topics with clarity. Besides, numerous solved examples and chapter-end exercises will help students reinforce their problem-solving skills. The book adopts a methodological approach to problem solving.

Primarily intended for both degree and diploma students of Computer Science and Engineering, the book will also be of benefit to the students of computer applications and management.

**CONTENTS:** Preface. Database Systems. Modelling a Database. Modelling with E-R Diagram. Principles of Relational Database Management Systems. Relational Database Design. Structured Query Language. Information Retrieval and Data Manipulation. Programming with PL/SQL. Query Processing and Optimization. Concurrent Transaction Processing. Database Recovery. File Organization, Indexing and Hashing. Data Warehousing and Data Mining. Index.

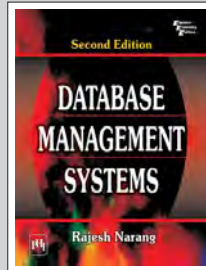
Latest Print 2013 / 268 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4674-1 / ₹ 250.00



## COMPUTER SCIENCE AND ENGINEERING

### Database Management Systems

#### Database Management Systems, 2nd ed.



**RAJESH NARANG**, Chief Technology Officer, National Institute of Smart Government, New Delhi.

The contents of this **second edition** have been appropriately enhanced to serve the growing needs of the students pursuing undergraduate engineering courses in Computer Science, Information Technology, as well as postgraduate programmes in Computer Applications (MCA), MSc (IT) and MSc (Computer Science). The book covers the fundamental and theoretical concepts in an elaborate manner using SQL of leading RDBMS—Oracle, MS SQL Server and Sybase.

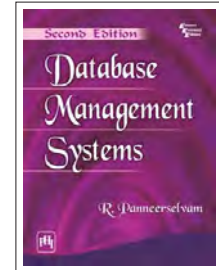
Realizing the importance of RDBMS in all types of architectures and applications, both traditional and modern topics are included for the benefit of IT-savvy readers. A strong understanding of the relational database design is provided in chapters on Entity-Relationship, Relational, Hierarchical and Network Data Models, Normalization, Relational Algebra and Relational Calculus. The architecture of the legacy relational database R system, the hierarchical database IMS of IBM and the network data model DBTG are also given due importance to bring completeness and to show thematic interrelationships among them.

Several chapters have been devoted to the latest database features and technologies such as Data Partitioning, Data Mirroring, Replication, High Availability, Security and Auditing. The architecture of Oracle, SQL of Oracle known as PL/SQL, SQL of both Sybase and MS SQL Server known as T-SQL have been covered.

**CONTENTS:** Preface. Introduction. The Entity-Relationship Model. Data Models. Storage Structure. Relational Data Structure. Architecture of System R and Oracle. Normalization. Structured Query Language. T-SQL—Triggers and Dynamic Execution. Procedure Language—SQL. Cursor Management and Advanced PL/SQL. Relational Algebra and Relational Calculus. Concurrency Control and Automatic Recovery. Distributed Database and Replication. High Availability and RAID Technology. Security Features Built in RDBMS. Queries Optimization. Architecture of a Hierarchical DBMS. The Architecture of Network based DBTG System. Comparison between Different Data Models. Performance Improvement and Partitioning. Database Mirroring and Log Shipping for Disaster Recovery. Bibliography. Answers to Selected Exercises. Index.

Latest Print 2012 / 480 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4313-9 / ` 325.00

#### Database Management Systems, 2nd ed.



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

This revised and updated book, now in its Second Edition, continues to provide excellent coverage of the basic concepts involved in database management systems. It provides a thorough treatment of some important topics such as data structure, data models and database design through presentation of well-defined algorithms, examples and real-life cases. There is also detailed coverage of data definition and data manipulation parts of IMS and PC-FOCUS—the two popular database management systems—to access and manipulate hierarchical database, besides IDMS (Network) and Interactive SQL (Relational) database languages, using suitable programs based on case studies.

#### WHAT IS NEW TO THIS EDITION

- Includes **five** new chapters, namely, Distributed Database Management System, Client/Server Systems, Data Warehousing, Data Mining, and Object Oriented Database Management System (OODBMS) to cover the modern concepts of DBMS.
- Provides a new section on cryptography for network security.

The textbook is primarily designed for the postgraduate students of management, computer science and information technology. It should also serve as a useful text for B.E./B.Tech. students in computer science engineering and software engineering. Besides students, this book will also be useful for computer professionals engaged in design, operation and maintenance of database.

**CONTENTS:** Preface. Preface to the First Edition. Introduction. Database Concepts. Data Structure. Data Models. Database Design. Implementation Design. Hierarchical Database Management Systems. Network Database Management Systems. Relational Database Management Systems. Distributed Database Management System. Client/Server Systems. Data Warehousing. Data Mining. Object Oriented Database Management System (OODBMS). Database Operations and Maintenance. Appendices. Bibliography. Index.

Latest Print 2011 / 404 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4277-4 / ` 295.00



## COMPUTER SCIENCE AND ENGINEERING

### Database Management Systems

Database Management System, Oracle SQL and PL/SQL  
2nd ed.




**PRANAB KUMAR DAS GUPTA**, *Senior Scientist in Defence Research and Development Organization (DRDO). Presently he is Joint Director at Proof and Experimental Establishment, Chandipur.*

**P. RADHA KRISHNA**, *Principal, Research Scientist at Infosys Labs, Infosys Limited, Hyderabad.*

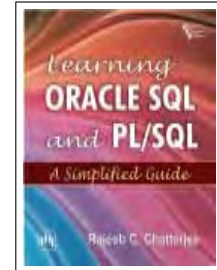
Database Management System (DBMS) and Oracle are essentially a part of the curriculum for undergraduate and postgraduate courses in Computer Science, Computer Applications, Computer Science and Engineering, Information Technology and Management. The book is organized into the three parts to introduce the theoretical and programming concepts of DBMS. Part I: Basic Concepts and Oracle SQL, deals with DBMS basic, software analysis and design, data flow diagram, ER model, relational algebra, normal forms, SQL queries, functions, subqueries, different types of joins, DCL, DDL, DML, object constraints and security in Oracle. Part II: Application Using Oracle PL/SQL, explains PL/SQL basics, functions, procedures, packages, exception handling, triggers, implicit, explicit and advanced cursors are explained using suitable examples. This part also covers advanced concepts related to PL/SQL such as collection, records, objects, dynamic SQL and performance tuning. Part III: Advanced Concepts and Technologies, elaborates advanced database concepts such as query processing, file organization, distributed architecture, backup, recovery, data warehousing, online analytical processing and data mining concepts and their techniques.

All the chapters include a large number of examples. To further reinforce the concepts, numerous objective type questions and workouts are provided at the end of each chapter.

**CONTENTS:** Preface. Acknowledgments. Database Basics, Software Analysis and Design, Data Flow Diagram and ER Model. Relational Algebra and Normal Forms. Query Processing, File Organization, Distributed Processing and Data Mining. Transaction Processing, Concurrency Control, Oracle Architecture, Backup and Recovery. SQL Basics, Functions, Sub Query and Joins. Data Manipulation Language, Objects, Constraints and Security in Oracle. Oracle PL/SQL Basics. Function, Procedure and Package. Oracle Exception Handler, Database Triggers and Implicit Cursor. Explicit and Advance Cursors. Answers. Index.

 Latest Print 2014 / 344 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4842-4 / 525.00

Learning Oracle SQL and PL/SQL:  
A Simplified Guide



**RAJEEB C. CHATTERJEE**, *Visiting faculty in the Department of Information Technology, Jadavpur University.*

This book offers a systematic knowledge of the Oracle SQL and PL/SQL so that the students can exploit the capabilities of the database in an effective and efficient manner. The book follows a step-by-step approach to the subject with suitable real-world cases, examples and exercises that make it a complete and effective self-study guide

The book can also be used for practical classes on oracle. It can be used for Oracle version 8.0 onwards. The availability of an authorized oracle database in conjunction with the book is sufficient to learn Oracle commands, syntaxes, operators, built-in function, techniques for creation, alterations and uses of table structures. Screenshots have not been presented in the book to avoid confusion due to differing platforms that the students may use in different environments.

Designed to address the need of the laboratory classes on Oracle for the undergraduate and postgraduate students of Computer Science and Information Technology as well as the students of Computer Applications, this book is also useful for the professionals for conducting training program on Oracle.

**CONTENTS:** Preface. Overview. Create Table Structure. Alter Table Structure. Insert a Row. Update Rows. Delete Rows. Query from Tables. Built-in Number Functions. Built-in Character Functions. Built-in Date Functions. Built-in Conversion Functions. Built-in Group Functions. Subquery. Advanced Join Methods. View. Sequence. Index. Synonym. Security. System Tables. SQL\*Plus. Introduction to PL/SQL. Control Structures. Procedure. Function. Package. Trigger. Cursor. Introduction to Oracle Architecture. Answers to Revision Questions. Index.

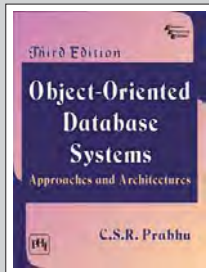
Latest Print 2012 / 312 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4542-3 / 350.00



## COMPUTER SCIENCE AND ENGINEERING

### Database Management Systems

#### Object-Oriented Database Systems: Approaches and Architectures, 3rd ed.



**C.S.R. PRABHU**, Deputy Director General and State Informatics Officer, National Informatics Centre (NIC), Andhra Pradesh State Unit, Hyderabad.

This well-received book, now in its third edition, is a comprehensive presentation of the fundamentals of object-oriented database systems (OODBMS). It provides extensive coverage of the different approaches to object data management, including the three major approaches—semantic database systems approach, object-oriented programming language extension approach, and the relational extension approach—as well as the various types of architectures of object-oriented database systems. The book discusses all recent developments in this field, such as the emergence of Java as the dominant object-oriented programming language—resulting in upcoming OODBMS products such as Ozone—and the provision of object-oriented database features in object-relational database systems (ORDBMS) products such as Oracle 9i and DB2.

The new edition provides an extensive discussion of PostgreSQL, a popular open source object-oriented database system which has emerged as a viable alternative to expensive commercial database systems such as Oracle.

The book is extensively illustrated, which enables students to develop a firm grasp of the underlying concepts. The chapter-end exercises help in testing the students' comprehension of the fundamental principles.

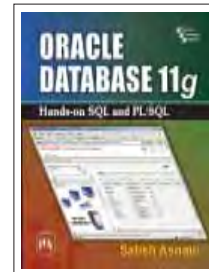
The book is primarily meant for students of IT-related programmes having courses in database systems. Computer professionals will also find the book immensely useful.

**CONTENTS:** Foreword. Preface. Preface to the First Edition. Acknowledgements. Introduction. Semantic Database Models and Systems. Object-oriented Database Systems. Relational Extensions. Object/Relational Systems (ORDBMSs). Standards for OODBMS products and Applications. Suggested Further Reading. Index.



Latest Print 2012 / 264 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-4093-0 / ₹ 250.00

#### Oracle Database 11g: Hands-on SQL and PL/SQL



**SATISH ASNANI**, Deputy Manager, Informatics Division, Bharat Heavy Electricals Limited, Bhopal.

The book teaches the basics of the Oracle database from a beginner's perspective to the advanced concepts using a hands-on approach. Each and every concept has been elaborated with suitable practical examples along with code for clear and precise understanding of the topic.

Using a practical approach, the book explains how to retrieve, add, update and delete data in the Oracle database using SQL, SQL\*PLUS and PL/SQL. In the process, it discusses the various data types and built-in functions of Oracle, as well as the sorting of records and the table operations. The text also includes coverage of advanced queries using special operators, Oracle security, indexing, and stored functions and procedures.

The book is suitable for undergraduate engineering students of Computer Science and Information Technology, B.Sc. (Computer Science/IT), M.Sc. (Computer Science/IT) and students of Computer Applications (BCA, MCA, PGDCA, and DCA). Besides, the book can be used as a reference by professionals pursuing short-term courses on Oracle Database and students of Oracle Certified Courses.

#### KEY FEATURES

- Includes numerous practical examples with code.
- Discusses commands executed and tested on the Oracle database software.
- Provides a large number of review questions, true/false and multiple choice questions along with lab assignments, at the end of each chapter.
- Includes new features of Oracle Database 11g.
- Presents normalization and ER-diagrams.
- Discusses database triggers and Oracle flashback technology.
- Gives Oracle FAQs.

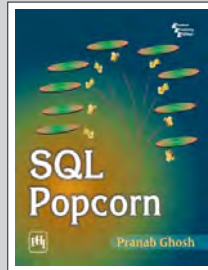
**CONTENTS:** Preface. Acknowledgements. Introduction to DBMS and RDBMS. Installation of Oracle 10g XE (Express Edition). Introduction to Oracle. Oracle Data Types. Oracle Operators. Integrity Constraints. Oracle Built-in Functions. Adding, Deleting and Modifying Records. Sorting. Table Operations—Altering Structure. Joins. Advanced Queries Using Special Operators. Indexing. Oracle Security—Privileges. Oracle Security—Roles. Sequences and Synonyms. Views and Materialized Views. SQL\*Plus Reporting. PL/SQL. Stored Functions. Stored Procedures. Oracle Packages. Exception Handling in PL/SQL. Cursors. Database Triggers. Oracle Flashback Technology. Normalization. Entity Relationship Diagram (ERD). Oracle FAQ. Oracle 11g New Features. Index.

Latest Print 2010 / 448 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4020-6 / ₹ 425.00



## SQL Popcorn

**PRANAB GHOSH**, *Scientist in Defence Research and Development Organization (DRDO)*. Presently, he is *Assistant Director (Computer Wing) at Proof and Experimental Establishment (PXE), Chandipur*.



This book presents the basics of SQL and teaches how to use it to create, modify and maintain a database in practical situations.

The book first exposes the readers to important features, functions and commands of SQL and then focuses on solving SQL queries in a step-by-step manner. It provides a number of SQL query examples and encourages the readers to try out various SQL queries to understand the underlying concepts. The book discusses the different real-life SQL queries related to a banking transaction system, publication management system, transport management system, employee information system, sales tracking system, teaching activity system, patient diagnostics system, and an automobile sales monitoring system, in order to acquaint the readers with more and more complex aspects of SQL.

## KEY FEATURES

- More than 150 well-balanced solved problems to help students learn query-solving techniques.
- A number of real-life examples to show relevant application of the procedures discussed.
- Self-test exercises including objective type questions at the end of each chapter for reinforcement of concepts through practice.

The book is useful for the students of BSc/MSc (Computer Science), BCA/MCA, BBA/MBA and BE/BTech (Computer Science and Engineering, and Information Technology) for their courses in database management systems.

**CONTENTS:** Preface. Acknowledgements. SQL—Brief Overview. Banking Transaction Information System. Publication Management System. Training Management System. Transport Management System. Employee Information System. Sales Tracking System. Teaching Activity Information System. Patient Diagnostics Information System. Automobile Sales Monitoring System. Appendix—A: Script of Tables Used. Appendix B: Frequently Used SQL Commands. Answers. Index.

Latest Print 2010 / 236 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3922-4 / ₹ 195.00



## Introduction to Digital Computer Design, An, 5th ed.



**V. RAJARAMAN**, *Honorary Professor, Supercomputer Education and Research Centre, Indian Institute of Science, Bangalore*.

**T. RADHAKRISHNAN**, *Professor of Computer Science and Software Engineering, Faculty of Engineering at Concordia University, Montreal, Canada*.

This well-received book, now in **fifth** edition, has been thoroughly revised and updated with new material on CMOS gates, MSI/ALU and Pentium5 architecture. The chapter on Cache and Virtual Memory has been rewritten. A new chapter on Parallel Computers has been added.

The first part of the book is devoted to digital techniques used in the design of digital circuits and small digital systems. The second part deals with logical organization and architecture of computers. It also describes a small hypothetical computer to illustrate how instruction sets are evolved. Real computers (namely, Pentium and MIPS machines) are described and compared with the hypothetical computer. The remainder of this part describes I/O devices, cache and virtual memory and parallel computers.

The book does not assume extensive knowledge of electronics or mathematics. A knowledge of programming in C or Java would be useful to give the student a proper perspective to appreciate the development of the subject. This textbook is suitable for B.Sc. (Electronics) and B.Tech. courses. Both the parts of the book are self-contained and may be used independently, if appropriate.

**CONTENTS:** Preface. Part I: Digital Techniques and Design—Data Representation. Arithmetic Operations. An Algebra for Digital Systems. Combinatorial Switching Circuits. Sequential Switching Circuits. Selected Examples of Digital Systems. Memory Organization. Part II: Logical Organization and Architecture—A Small Computer Organization. Central Processing Unit. Input-Output Devices. Input-Output Organization. Cache and Virtual Memory. Parallelism in Computing. Appendix: Decision Table Terminology. Index.

Latest Print 2012 / 528 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3409-0 / ₹ 325.00

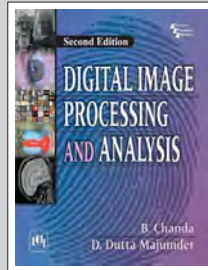




## COMPUTER SCIENCE AND ENGINEERING

### Digital Image Processing

#### Digital Image Processing and Analysis, 2nd ed.



**BHABATOSH CHANDA**, *Professor, Electronics and Communication Sciences Unit, Indian Statistical Institute, Kolkata.*

**DWIJESH DUTTA MAJUMDER**, *Professor Emeritus, Electronics and Communication Sciences Unit, Indian Statistical Institute, Kolkata.*

The second edition of this extensively revised and updated text is a result of the positive feedback and constructive suggestions received from academics and students alike. It discusses the fundamentals as well as the advances in digital image processing and analysis—both theory and practice—to fulfil the needs of students pursuing courses in Computer Science and Engineering (CSE) and Electronics and Communication Engineering (ECE), both at undergraduate and postgraduate levels. It is also considered useful for teachers, professional engineers and researchers.

The second edition has three objectives. First, each and every chapter has been modified in the light of recent advances as well as emerging concepts. Second, a good deal of colour image processing has been incorporated. A large number of line drawings and images have been included to make the book student friendly. Third, some new problems have been added in almost all chapters to test the student's understanding of the real-life problems.

The other distinguishing features of the book are:

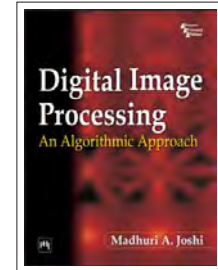
- A summary at the end of the chapter to help the student capture the key points.
- About 320 line drawings and 280 photographs for easy assimilation of the concepts.
- Chapter-end problems for extensive practice and research.

**CONTENTS:** Preface. Acknowledgements. Part I: Digital Image—Introduction. Mathematical Preliminaries. Visual Preliminaries. Image Formation. Digitization. Part II: Image Processing—Image Enhancement. Restoration. Image Compression. Registration. Multi-valued Image Processing. Part III: Image Analysis—Segmentation. Edge and Line Detection. Feature Extraction. Description. Recognition. Index.



Latest Print 2012 / 488 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4325-2 / ₹ 325.00

#### Digital Image Processing: An Algorithmic Approach



**MADHURI A. JOSHI**, *Professor of Electronics at the College of Engineering, Pune.*

This introduction to the fundamental concepts and methodologies of image processing is suitable for first-year postgraduate and senior undergraduate students in almost any engineering discipline, and in particular meets the requirement of the prescribed courses in the following streams:

- Electronics and Communication
- Computer Science and Engineering
- Information and Communication Technology

The book offers a balanced exposition of basic principles and applications of image processing. It lays considerable emphasis on the algorithmic approach in order to teach students how to write good practical programs for problem solving.

#### MAJOR TOPICS COVERED INCLUDE

- Image fundamentals
- Different image transforms
- Image enhancement in the spatial and frequency domains
- Restoration
- Image analysis
- Image description
- Image compression, and
- Image reconstruction from projections
- Applications of image processing in the areas of biometrics, speaker recognition, satellite imaging, medical imaging, and many more.

The style of presentation is comprehensive and application oriented, comprising examples, diagrams, image results, case studies of applications, and review questions—making it easy for students to understand key ideas, their practical relevance and applications.

**CONTENTS:** Preface. Digital Image Processing. Different Image Transforms. Image Enhancement. Restoration. Image Analysis. Applications of Image Processing. Image Coding and Image Compression. Computer Tomography. C Programs. Appendix A: Algorithm for Hadamard Transforms. Appendix B: Examples of Watermarking Using a Block Transform. References. Index.

Latest Print 2013 / 356 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2971-3 / ₹ 325.00



## Digital Logic and Computer Organization

**V. RAJARAMAN**, *Honorary Professor, Supercomputer Education and Research Centre, Indian Institute of Science, Bangalore.*

**T. RADHAKRISHNAN**, *Professor of Computer Science and Software Engineering in the Faculty of Engineering, Concordia University in Montreal.*



This introductory text on 'digital logic and computer organization' presents a logical treatment of all the fundamental concepts necessary to understand the organization and design of a computer. It is designed to cover the requirements of a first-course in computer organization for undergraduate Computer Science, Electronics, or MCA students. Beginning from first principles, the text guides students through to a stage where they are able to design and build a small computer with available IC chips.

Starting with the foundation material on data representation, computer arithmetic and combinatorial and sequential circuit design, the text explains ALU design and includes a discussion on an ALU IC chip. It also discusses Algorithmic State Machine and its representation using a Hardware Description Language before shifting to computer organization.

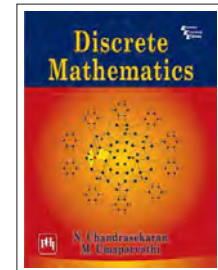
The evolutionary development of a small hypothetical computer is described illustrating hardware-software trade-off in computer organization. Its instruction set is designed giving reasons why each new instruction is introduced. This is followed by a description of the general features of a CPU, organization of main memory and I/O systems. The book concludes with a chapter describing the features of a real computer, namely the Intel Pentium. An appendix describes a number of laboratory experiments which can be put together by students, culminating in the design of a toy computer.

**CONTENTS:** Preface. Data Representation. Boolean Algebra and Logic Gates. Combinatorial Switching Circuits. Sequential Switching Circuits. Arithmetic and Logic Unit. Application of Sequential Circuits. Computer Systems—Multiple Views. Basic Computer Organization. Central Processing Unit. Memory Organization. Input-output Devices. Input-Output Organization. Case Study of a Real Computer System. Appendix—A: Suggested Hardware Lab Experiments. B: Decision Table Terminology. References. Index.

**Latest Print 2011 / 528 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-2979-9 / ₹ 295.00**



## Discrete Mathematics



**N. CHANDRASEKARAN**, *has been Professor of Mathematics at St. Joseph's College, Tiruchirapalli.*

**M. UMAPARVATHI**, *has been Professor of Mathematics at Seethalakshmi Ramaswami College, Tiruchirapalli.*

Written with a strong pedagogical focus, this book is an exhaustive presentation of the fundamental concepts of discrete mathematical structures and their applications in computer science and mathematics. It aims to develop the ability of the students to apply mathematical thought in order to solve computation-related problems. The book is intended not only for the undergraduate and postgraduate students of mathematics but also, most importantly, for the students of Computer Science & Engineering and Computer Applications.

The introductory chapter presents an overview of the foundations of the subject, consisting of topics such as logic, set theory, relations, functions, algebraic structures, and graphs. The subsequent chapters provide detailed coverage of each of these topics as well as major areas of discrete mathematics such as combinatorics, lattices and Boolean algebras. Major applications such as computer models and computation, coding theory, cryptography and databases are dealt with in the final chapters of the book.

The book is replete with features which enable the building of a firm foundation of the underlying principles of the subject and also provide adequate scope for testing the comprehension acquired by the students. Each chapter contains numerous worked-out examples within the main discussion as well as several chapter-end Supplementary Examples for revision. The Self-Test and Exercises at the end of each chapter provide large numbers of objective type questions and problems respectively. Answers to objective type questions and hints to exercises are also provided. All these pedagogic features, together with thorough coverage of the subject matter, make this book a very readable text for beginners as well as advanced learners of the subject.

**CONTENTS:** Preface. Foundations. Predicate Calculus. Combinatorics. More on Sets. Relations and Functions. Recurrence Relations. Algebraic Structures. Lattices. Boolean Algebras. Graph Theory. Trees. Models of Computers and Computation. Additional Topics. Further Reading. Index.

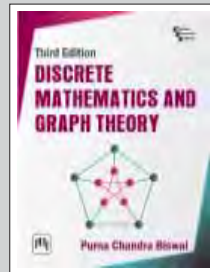
**Latest Print 2010 / 832 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-3938-5 / ₹ 425.00**



## COMPUTER SCIENCE AND ENGINEERING

### Discrete Mathematics

#### Discrete Mathematics and Graph Theory, 3rd ed.



**PURNA CHANDRA BISWAL**, *Assistant Professor of Mathematics at Parala Maharaja Engineering College, Berhampur, Odisha.*

This textbook, now in its third edition, continues to provide an accessible introduction to discrete mathematics and graph theory.

The introductory material on Mathematical Logic is followed by extensive coverage of combinatorics, recurrence relation, binary relations, coding theory, distributive lattice, bipartite graphs, trees, algebra, and Polya's counting principle. A number of selected results and methods of discrete mathematics are discussed in a logically coherent fashion from the areas of mathematical logic, set theory, combinatorics, binary relation and function, Boolean lattice, planarity, and group theory. There is an abundance of examples, illustrations and exercises spread throughout the book. A good number of problems in the exercises help students test their knowledge.

The text is intended for the undergraduate students of Computer Science and Engineering as well as students of Mathematics and those pursuing courses in the areas of Computer Applications and Information Technology.

#### NEW TO THE THIRD EDITION

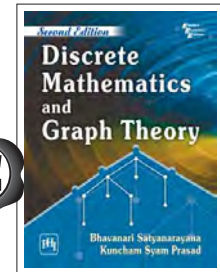
- Includes a new chapter (Chapter 2) on Methods of proof.
- Contains new sections on Enumeration of graphs, Branching process in enumerating trees, Pseudo Boolean lattice, and Subgroup.
- Redistributes most of the problems given in exercises section-wise.
- Provides many examples and exercises.
- Gives elaborate hints for solving exercise problems.

**CONTENTS:** Preface. Preface to the First Edition. List of Symbols. Mathematical Logic. Methods of Proof. Combinatorics. Recurrence Relation. Binary Relation and Function. Graph Theory. Algebraic System and Lattice. System with One Binary Operation. Finitely Generated Group. Homomorphism. Counting Principle. Permutation Group. Sylow's Theorem. System with Two Binary Operations. Coding Theory. Bibliography. Index.



Latest Print 2013 / 704 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4691-8 / ₹ 450.00

#### Discrete Mathematics and Graph Theory, 2nd ed.



**BHAVANARI SATYANARAYANA**, *Professor of Mathematics at Acharya Nagarjuna University, Nagarjuna Nagar, Andhra Pradesh.*

**KUNCHAM SYAM PRASAD**, *Associate Professor of Mathematics at Manipal Institute of Technology, Manipal, Karnataka.*

This comprehensive and self-contained text provides a thorough understanding of the concepts and applications of discrete mathematics and graph theory. It is written in such a manner that beginners can develop an interest in the subject. Besides providing the essentials of theory, the book helps develop problem-solving techniques and sharpens the skill of thinking logically.

The book is organized in two parts. The first part on discrete mathematics covers a wide range of topics such as predicate logic, recurrences, generating function, combinatorics, partially ordered sets, lattices, Boolean algebra, finite state machines, finite fields, elementary number theory and discrete probability. The second part on graph theory covers planarity, colouring and partitioning, directed and algebraic graphs.

In the **Second Edition**, more exercises with answers have been added in various chapters. Besides, an appendix on languages has also been included at the end of the book.

The book is intended to serve as a textbook for undergraduate engineering students of computer science and engineering, information communication technology (ICT), and undergraduate and postgraduate students of mathematics. It will also be useful for undergraduate and postgraduate students of computer applications.

**CONTENTS:** Preface. Part I: DISCRETE MATHEMATICS—Preliminary Notations. Fundamentals of Logic. Recurrences and Integer Functions. Counting Techniques. Algebraic Systems. Partially-Ordered Sets. Lattices. Boolean Algebras. Finite Machines. Finite Fields. Elementary Number Theory. Discrete Probability. Part II: GRAPH THEORY—Preliminary Concepts. Planarity, Colouring and Partitioning. Some Algebraic Aspects of Graphs. Directed Graphs. Appendix: Languages. Bibliography. Glossary. Index.

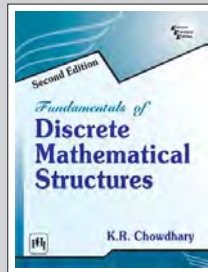
Latest Print 2014 / 496 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4948-3 / ₹ 395.00



## COMPUTER SCIENCE AND ENGINEERING

### Discrete Mathematics

#### Fundamentals of Discrete Mathematical Structures, 2nd ed.



**K.R. CHOWDHARY**, Professor and Head in the Department of Computer Science and Engineering, M.B.M. Engineering College, Jodhpur.

This thoroughly revised and updated text, now in its Second Edition, continues to provide the basic concepts of discrete mathematics and its applications at an appropriate level of rigour.

The text teaches mathematical logic, discusses how to work with discrete structures, analyzes combinatorial approach to problem-solving and develops an ability to create and understand mathematical models and algorithms essentials for writing computer programs. Every concept introduced in the text is first explained from the point of view of mathematics, followed by its relation to Computer Science. In addition, it offers excellent coverage of graph theory, mathematical reasoning, foundational material on set theory, relations and their computer representation, supported by a number of Worked-out Examples and Exercises to reinforce the students' skill.

Primarily intended for undergraduate students of Computer Science and Engineering, and Information Technology, this text will be also useful for undergraduate and postgraduate students of Computer Applications.

#### NEW TO THIS EDITION

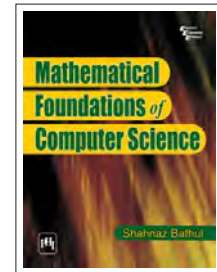
- Contains many new sections such as Russell's paradox, injection, surjection, bijection, Schroeder-Bernstein theorem, graph and map coloring, and Bipartite graph.
- Includes more questions in chapter-end Exercises.

**CONTENTS:** Preface. Preface to the First Edition. Discrete Structures and Set Theory. Induction, Recursion, and Recurrences. Combinatorics. Discrete Probability. Mathematical Logic. Logical Inferencing. Predicate Logic. Graph Theory. Relations. Transitive Closure And Warshall's Algorithm. Equivalence and Partial Ordering Relations. Trees. Algebraic Systems. Languages, Automata and Grammars. Prime Numbers and Cryptosystems. Bibliography. Index.

Latest Print 2012 / 312 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4506-5 / ` 295.00



#### Mathematical Foundations of Computer Science



**SHAHNAZ BATHUL** is Professor, Department of Mathematics, Jawaharlal Nehru Technological University Hyderabad, Kukatpally.

This book provides the basic concepts and applications of discrete mathematics and graph theory. The book is aimed at undergraduate students of Computer Science and Engineering, and Information Technology. It is also suitable for undergraduate and postgraduate students of Computer Science, Mathematics and Computer Applications.

The book exposes the students to fundamental knowledge in:

- Mathematical logic, tautology and normal forms
- Predicate logic, rules of inference and validity of arguments
- Elementary set theory, Venn diagrams, functions and their relations
- Algebraic structure, binary operation, group theory and homomorphism
- Theory of permutations and combinations, binomial and multinomial theorems
- Recurrence relations and methods of solving them
- Graph theory, spanning tree, Eulerian and Hamiltonian circuits and isomorphism

#### KEY FEATURES

- Includes a large number of worked-out problems for sound understanding of the concepts.
- Offers chapter-end exercises to test students' comprehension of theory.
- Gives a quiz section at the end of each chapter to help students prepare for the competitive examinations.

**CONTENTS:** Preface. Mathematical Logic. Calculus of Predicates. Elementary Set Theory. Algebraic Structure. Combinatorics. Recurrence Relations. Graph Theory. Subgraphs. Index.

Latest Print 2010 / 372 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4157-9 / ` 325.00



## E-Commerce: An Indian Perspective, 4th ed.

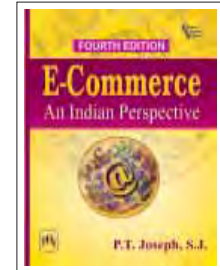
**P.T. JOSEPH, S.J.**, *Professor, Information Systems and Organizational Behaviour at the Xavier Institute of Management (XIM), Bhubaneswar. Currently, he also holds the position of the Director of XIM Bhubaneswar.*

Electronic Commerce is an exciting field of business sector, with new issues emerging continually in this global and real time business activity. The comprehensive coverage of this fourth edition equips the students with the latest information in e-commerce-concepts, models, strategies, and techniques that can be used to build useful e-commerce applications.

The range of topics covered is broad, making this book a solid introductory text for the rapidly expanding number of courses in e-commerce for business students at the undergraduate or postgraduate level, and also for students pursuing courses in computer applications, information technology and information science.

The book features several comprehensive and diverse case studies and data on Indian corporations, as well as multinational companies showing success and failure of their Web-based electronic business models. New material on developments in technology and general business strategy has been added in all the chapters.

This fundamental treatment of the subject of e-commerce coupled with a clear and practical analysis of market models,



continues to make this text an invaluable single source guide for students-arming them with skills to deal successfully with the managerial issues they will face as future business professionals.

### KEY FEATURES

- Provides coverage of all elements of e-commerce including customer relationship, supply chain management, e-payment, e-security, mobile commerce, and Web designing.
- Addresses key legal issues related to cyberstalking, privacy, copyright, and so forth.
- Gives the end-of-chapter Internet search exercises to help students develop analytical skills.
- Defines key technical terms in the glossary.

**CONTENTS:** Preface. History of e-commerce and Indian Business Context. Business Models for e-commerce. Enabling Technologies of the World Wide Web. e-Marketing. e-Security. e-Payment Systems. e-Customer Relationship Management. e-Supply Chain Management. e-Strategy and Knowledge Management. Information Systems for Mobile Commerce. Portals for e-Business. Legal and Ethical Issues. Glossary. Index.

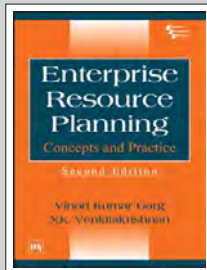
Latest Print 2013 / 568 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4505-8 / ₹ 425.00



## COMPUTER SCIENCE AND ENGINEERING

### ERP (ENTERPRISE RESOURCE PLANNING)

#### Enterprise Resource Planning: Concepts and Practice, 2nd ed.



**VINOD KUMAR GARG**, *Professor of Information Management at S.P. Jain Institute of Management and Research, Mumbai.*

**N.K. VENKITAKRISHNAN**, *General Manager, Sales, for a leading software organization based in Mumbai.*

Enterprise Resource Planning (ERP), one of the fastest growing segments in Information Technology today, enables organizations to respond quickly to the ever increasing customer needs and to capitalize on market opportunities.

This revised edition continues to throw light on the significance of Business Engineering and its link with Information Technology. Besides, it discusses the role of consultants, vendors and users, the process of customization, as well as the methodology and guidelines for ERP implementation.

Chief executives, functional managers, MIS managers, students of management courses and organizations will find this book as an easy reference for understanding the concepts of ERP and enable organizations to implement ERP solutions.

#### HIGHLIGHTS OF THE SECOND EDITION

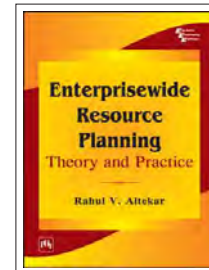
- Focuses on Indian ERP packages, with a new section on “Example of an Indian ERP Package”.
- Provides Answers at the end of the book to most of the problems given at the end of each chapter for the benefit of both the students and the teachers.

**CONTENTS:** Preface. Preface to the First Edition. Acknowledgements. Prologue. ERP—A Curtain Raiser. Business Engineering and ERP. Business Modelling for ERP. ERP Implementation. ERP and the Competitive Advantage. The ERP Domain. Marketing of ERP. Case Studies. Appendix. Further Reading. Answers to Selected Problems. Index.

Latest Print 2014 / 200 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-2254-7 / ₹ 175.00



#### Enterprisewide Resource Planning: Theory and Practice



**RAHUL V. ALTEKAR**, *Director—Strategic Services, JDA India, Visiting Faculty—NITIE, Welinkars.*

He can be reached at [altekarrahul@consultant.com](mailto:altekarrahul@consultant.com)

Over the last two decades, large corporations and companies worldwide have been implementing Enterprisewide Resource Planning (ERP) applications. This has today percolated down to the midsize companies as the benefits of ERP applications are appreciated. Not surprisingly, in business schools across the country, ERP has become a popular and major subject of study. This accessible, easy-to-read book explains the ERP concept, its theory and implementation with **practical case studies**. Throughout, the focus remains on the *Indian scenario*. While Part I of the book deals with the theory of ERP with detailed discussions on best practices in ERP, ERP vendor analysis, its basic functional modules and its implementation, Part II describes ERP “As Is” to ERP “To Be”.

The book details and delineates the fundamental and advanced features of ERP in a style that is intelligible to the reader. It presents a structured methodology designed to help students understand the conceptual elements of ERP as well its implementation.

The book is intended as a text for postgraduate students of management and as reference for the practicing professionals. That it is based on the author’s vast experience in the subject in more than 65 Indian manufacturing companies, and is a reader-friendly text with a number of diagrams, screenshots, and tables further enhances its value.

**CONTENTS:** Preface. Part I: Theory of ERP. Introduction. Origin, Evolution and Structure. The Best Practices in ERP. ERP Vendor Analysis. Basic Functional Modules in ERP. ERP Implementation. Part II: Making ERP A Success—ERP “As Is”. ERP “To Be”. Bibliography. Index.

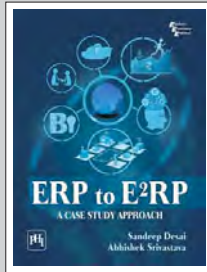
Latest Print 2013 / 164 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-2633-0 / ₹ 175.00



## COMPUTER SCIENCE AND ENGINEERING

### ERP (ENTERPRISE RESOURCE PLANNING)

#### ERP to E<sup>2</sup>RP: A Case Study Approach



**SANDEEP DESAI**, Executive Vice President (Information Technology), AFCONS Infrastructure Limited, Mumbai.

**ABHISHEK SRIVASTAVA**, software engineering, is a partner at TECHCANVASS, a company developing new age software applications for healthcare industry. He is an IT professional with diverse experience in banking, insurance, power and government sectors.

*ERP to E<sup>2</sup>RP: A Case Study Approach* is a comprehensive and well-organized book that covers the wide aspects of ERP and E<sup>2</sup>RP.

The text highlights the details of operational and supporting processes related to industry verticals, namely, manufacturing, healthcare and construction. It presents general implementation methodologies as well as specific methodologies prescribed by Oracle and SAP for the implementation of their products. The book contains few sample business processes that are mapped with the help of ERP product screens.

Following a simple and engaging style, this book is primarily designed for the undergraduate students of computer science and engineering, information technology and also for the postgraduate students of management and computer application.

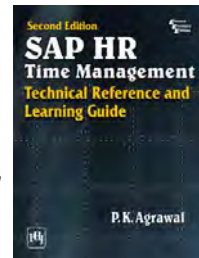
**CONTENTS:** Preface. Acknowledgements. Introducing ERP and E<sup>2</sup>RP. Business Processes. Supporting Processes. ERP: Functional and Technical Architecture. ERP Implementation. ERP Processes. *Case Studies*. Extended ERP (EERP or E<sup>2</sup>RP). Customer Relationship Management (CRM). Supply Chain Management (SCM). Business Intelligence (BI). Intranet and Knowledge Management. ERP: Cloud and Open Source. Appendix: Career in ERP. Suggested Readings. Glossary. Index.

Latest Print 2013 / 416 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4804-2 / ₹ 450.00



#### SAP HR Time Management: Technical Reference and Learning Guide, 2nd ed.



**P. K. AGRAWAL**, formerly Program Manager at Tata Technologies Limited, Pune.

This book explains all the concepts underpinning SAP's HR Time Management Module. It is a comprehensive technical manual which explains every single node of the User Menu and the Configuration. The book first gives an overview of a concept explaining what it is, how it is used and how it relates to the other concepts. It then explains its properties, which are fields in a configuration node.

This book is designed to be used both as a reference manual and a learning guide. As a learning guide, it offers four views, each for a different target audience.

- It can be read from the Senior Management's perspective to gain a broad understanding of the subject and what SAP can do for them.
- Business Process Owners can achieve a higher level of understanding by getting to know more of SAP concepts and how to perform different tasks in SAP.
- Users can acquire a thorough understanding of different tasks and concepts underlying them.
- Functional consultants and proficient users can read the book to gain a complete understanding of the system.

As a technical reference, the book can be used to locate the relevant material through the Table of Contents, Index, 'SAP Menu' and 'SAP Customizing Implementation Guide (IMG)'. The last two follow the Table of Contents. If the reader is in SAP's User Menu or Configuration, the chapter number for these nodes can be found in 'SAP Menu' and 'IMG'. If a node is not covered in the book, the reason for not doing so is mentioned.

The implementation of SAP HR Time Management and documentation can also be guided by the structure of this book.

**CONTENTS:** Preface. Infotypes. Employee Groupings. Work Schedule. Substitution. Absence. Attendance. Absence Quota. Quota Correction. Attendance Quota. Quota Compensation. Overtime. Availability. Time Recording. Time Events. Time Transfer. Employee Remuneration. Maternity Leave. Military Service. Additional Absence Data. Flextime. Activity Allocation. Cost Assignment. External Services. Different Payment. Time Data Collection. Employee Expenditure Collection. Logistics Integration. Time Evaluation Configuration. Cluster B1. Cluster B2 (Time Evaluation Results). Internal Tables. Time Evaluation with Clock Times (Schema TM00). Schemas, Functions, PCRs, Operations, Features. Time Manager's Workplace. Time Management Pool. Cross-Application Time Sheet. Incentive Wages. Shift Planning. Utilities. Index. World Government. World Language. Good Governance. City without Traffic Lights.

Latest Print 2014 / 756 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4065-7 / ₹ 595.00



## SAP HR OM, PD and Training: Technical Reference and Learning Guide

**P.K. AGRAWAL**, formerly Program Manager at Tata Technologies Limited, Pune.

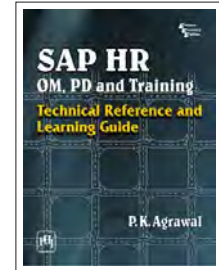
This book explains all the concepts underpinning the Organizational Management (OM), Personnel Development (PD) and Training and Event Management modules of SAP HR. It is a comprehensive technical manual which explains every single node of User Menu and the Configuration. The book first gives an overview of a concept explaining what it is, how it is used and how it relates to other concepts. It then explains its properties, which are fields in a configuration node.

This book is designed to be used both as a reference manual and a learning guide. As a learning guide, it offers four views, each for a different target audience.

- It can be read from the Senior Management's perspective to gain a broad understanding of the subject and what SAP can do for them.
- Business Process Owners can achieve a higher level of understanding by getting to know more of SAP concepts and how to perform different tasks in SAP.
- Users can acquire a thorough understanding of different tasks and concepts underlying them.
- Functional Consultants and proficient users can read the book to gain a complete understanding of the system.

As a technical reference, the book can be used to locate the relevant material through the Table of Contents, Index, 'SAP Menu' and 'Implementation Guide for R/3 Customizing (IMG)'. The last two follow the Table of Contents. If the reader is in SAP's User Menu or Configuration, the chapter number for these nodes can be found in 'SAP Menu' and 'IMG'. If a node is not covered in the book the reason for it is also mentioned.

The implementation of SAP HR OM, PD and Training and documentation can also be guided by the structure of this book.



**A Better World:** There is a lot that we can do to make our World a better World, just as we discover better ways to support our businesses. Read short articles inside on some of the ideas of World Integration and Improvement Initiative.

- World Government
- Good Governance
- World Language
- City without Traffic Lights

**Books on SAP HR:** The following other books on SAP HR have also been published by PHI Learning, New Delhi:

1. *SAP HR Time Management*
2. *SAP HR Personnel Administration and Recruitment*
3. *SAP HR India Payroll*

**CONTENTS:** SAP Menu. SAP Customizing Implementation Guide. Preface. Section One: ORGANIZATIONAL MANAGEMENT—Organizational Plan. Organizational Management Interfaces. Organizational Unit. Position. Job. Person. User. Task. Work Center. Objects. Relationships. Structures. Infotype Features. Infotypes. Plan Version. Planning Status. Authorizations. Organizational Management Integration. Database Utilities and Dialog Control. Data Transfer. Organization and Staffing Interface Customizing. Data Model. Section Two: PERSONNEL DEVELOPMENT—Qualifications Catalog. Profiles. Career and Succession Planning. Development Plan. Appraisals. Personnel Development Integration. Section Three: TRAINING AND EVENT MANAGEMENT—Business Event Catalog. Business Event Group. Business Event Type. Dynamic Menus. Resources. Business Events. Attendee. Attendance. Correspondence. Training Integration. Utilities. Index. World Government. World Language. Good Governance. City without Traffic Lights.

Latest Print 2014 / 784 pp. / 17.8 x 23.5 cm  
ISBN-978-81-203-3984-2 / ₹ 595.00





## SAP HR Personnel Administration and Recruitment: Technical Reference and Learning Guide, 2nd ed.

**P.K. AGRAWAL** was a Program Manager at Tata Technologies Limited, Pune.

### SAP HR BOOKS

This book is one of the set of our four books on SAP HR written by the author:

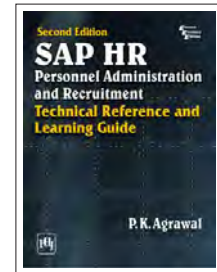
- SAP HR OM, PD and Training
- SAP HR Personnel Administration and Recruitment
- SAP HR Time Management
- SAP HR India Payroll

### A Better World

There is a lot we can do to make our world a better world. Read short articles inside on some of the ideas of World Integration and Improvement Initiative.

- World Government, 655
- World Language, 657
- Good Governance, 663
- City without Traffic Lights, 669

SAP is a great software. One needs to fully understand its features in order to effectively exploit them for the benefit of customers. Mr. Agrawal's books on SAP HR have a unique approach. A chapter usually focuses on a single business concept, and discusses the user interface as well as its associated configuration. This logical division makes it easier for readers to understand the functionality. Another important feature of these books is the level of detail. Each screen and each field in a screen is explained. Explanation includes meaning, use case and in some cases guidelines. Details are balanced by overviews explaining the concepts and their relationships. While explaining functionality, Mr. Agrawal has made efforts to highlight what can be done and how it is to be done. This is particularly important for less experienced users and consultants. Indicating chapter numbers against each menu and configuration item is a very useful innovation, as it establishes direct link between the SAP system and the book. Another useful feature is that these books can be read not only by consultants, but also by users, business process owners and even by senior



managers. The importance of each topic for each category of users is specified.

Mr. Agrawal has taken considerable pains in writing these books, and I congratulate Mr. Agrawal on his achievement and thank him for his contribution to the SAP community.

**K. Sanjai**, Regional Head—Asia Pacific & Japan,  
SAP Global Delivery

**CONTENTS:** SAP Menu. SAP Customizing Implementation Guide. Preface. Personnel Administration—Infotypes. Common Infotype Structure. Actions. Organizational Assignment. Personal Data. Payroll Status. Challenge. Addresses. Planned Working Time. Contract Elements. Monitoring of Tasks. Family Member/Dependents. Education. Other/Previous Employers. Skills. Internal Medical Service. Powers of Attorney. Internal Data. Corporate Functions. Company Instructions. Insurance. Objects on Loan. Date Specifications. Works Councils. Disciplinary Action and Grievances. Communication. Employee's Applicant Number. Calculation of Employment Period. Wage Type. Basic Pay. Bank Details. External Bank Transfers. Recurring Payments/Deductions. Additional Payments. Cost Distribution. Loans. Membership Fees. Notifications. Additional Off-cycle Payments. ESS Settings Remuneration Statement. Infotype Properties. Infotype Menus. Infotype Screens. Infotype Change Tracking. Cost Assignment. Payment Model. Ad Hoc Query. HIS. Authorizations. Optical Archiving. Concurrent Employment. Recruitment—Recruitment Process. Applicant. Application. Vacancy Assignment. Applicant Action. Applicant Activities. Applicant Activity Status. Applicant's Personnel Number. Applicant's Organizational Assignment. Applicant's Contract Elements. Other Recruitment Configuration. Utilities. Index. World Government. World Language. Good Governance. City without Traffic Lights.

Latest Print 2014 / 720 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4223-1 / 595.00



## SAP MM Inventory Management: Technical Reference and Learning Guide

**P.K. AGRAWAL** was a Program Manager at Tata Technologies Limited, Pune.

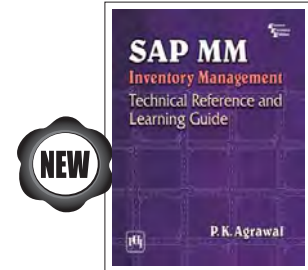
SAP is a powerful software that meets the requirement of business all over the world. This well-organised book comprising 34 chapters is useful for both beginners and professionals. Being a learning guide and a user manual, the book will be immensely valuable for all those who are training to be SAP consultant. If you are a material/production manager, a QM professional or a business executive, you will find that the book brings a lot of convenience in your work and minimises inventory losses.

### A New Approach to SAP Implementation

**Structured dialog:** The dialog between the consultant and the users should be based on the structure of this book. The consultant would demonstrate a business transaction, e.g. goods receipt, in its simplest form. He would then explain the data items on the screens, their meaning and significance. He would enquire whether the data item is relevant for the client company. The data items that are not relevant can be hidden in the implementation, and related configuration marked as not required. When the consultant would come to a section explaining IMG node, his questions to the user would be designed to collect the information required to configure that node.

**Prototyping:** As the structured dialog continues, the consultant would go on doing the configuration. By the end of the dialog, the consultant would have built a company-specific prototype.

**Training and trials:** The prototype would be a rough-cut implementation of SAP for the company. It would be used for training the users. After training, the users would try out the system. They would perform routine transactions several times using real-life data of their company. They would try different scenarios and record their observations.



**Refinement:** After prototype trials, the consultant and the users would sit together to discuss what the users required to do, but could not do with the prototype. The consultant would use this input to refine the prototype and to build new functionality, if needed.

**Configuration manual:** The documentation of SAP implementation includes a configuration manual. This configuration manual should be structured on the lines of this book as explained in Chapter 34. Such a configuration manual will be easy to understand as it groups logically related elements together.

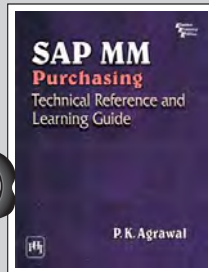
**User manual:** This book will serve as a generic user manual. Company-specific user manual can also be structured on the lines of this book including only company-specific guidelines for the users.

**CONTENTS:** SAP Menu. SAP Customizing Implementation Guide. Reasons for 'why not covered'. Preface. Enterprise Structure. Material. Goods and Accounts Movement. Stock. Goods Receipt. Goods Issue. Goods Return. Stock Transfer. Transfer Posting. Customer Returns. Subcontracting. Consignment Stock of Vendor. Consignment Stock with Customer. Project Stock. Sales Order Stock. Pipeline Material. Returnable Transport Packaging of Vendor. Returnable Transport Packaging with Customer. Goods Movement Reversal. Screen Layout. Movement Type and Other Configurations. Material Document. Accounting Documents. Output Determination. Material Valuation. Account Determination. Stock Determination. Reservation. Physical Inventory. Financial Accounting. Controlling. Periodic Processing. Archiving. Utilities. Index. World Government. World Language. Good Governance. City without Traffic Lights.

Latest Print 2014 / 928 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4976-6 / ₹ 795.00



### SAP MM Purchasing: Technical Reference and Learning Guide



**P.K. AGRAWAL** was a Program Manager at Tata Technologies Limited, Pune.

SAP is a powerful software that can meet the needs of any business and for any type of business in any part of the world. Its all encompassing nature makes SAP complex. To understand SAP well, in this book on *SAP MM Purchasing*, like in his earlier four books on SAP (HR module), the author gives an indepth analysis of SAP, with its focus on **materials management purchasing**.

Divided into 26 chapters, the book clearly explains both the SAP Menu and the Customizing Implementation Guide. It also indicates the chapter number where these are covered, thereby creating a direct link between the book and the SAP software.

This well-organized book can be used to learn SAP from scratch. Being a **learning guide**, it would be immensely valuable for all those who are **training to be SAP Consultant**. The book would be especially useful to **Business Process Owners** and **Senior Managers** to get an overview of SAP and the important choices it offers.

#### SALIENT FEATURES

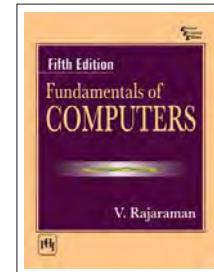
- The book balances details with overviews which explain linkages between concepts.
- Each chapter forms an important business concept and covers business processes carried out in SAP by the user.
- The book can be used as a **User Manual** by SAP readers.
- SAP implementation becomes easy by using the book.

**CONTENTS:** Preface. Organization. Material. Vendor. Purchasing Scenarios. Purchasing Document Screens. Purchase Requisition. Request for Quotation/ Quotation. Purchase Order. Contract. Scheduling Agreement. Account Assignment. Release Procedure for Purchasing Documents. Release Procedure for Purchase Requisitions. Purchasing Info Record. Source List. Quota Arrangement. Source Determination. Pricing Procedure. Taxes. Vendor Evaluation. Manufacturer Part. Confirmations. Messages. Partners. Archiving. Utilities. Index.

Latest Print 2014 / 896 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4851-6 / ₹ 795.00



### Fundamentals of Computers, 5th ed.



**V. RAJARAMAN**, Honorary Professor in the Super-computer Education and Research Centre, Indian Institute of Science, Bangalore.

The fifth edition of highly acclaimed "**Fundamentals of Computers**" lucidly presents how a computer system functions, besides teaching basics of programming. Both hardware and software aspects of computers are covered. The book begins with how numeric and character data are represented in a computer, how various input and output units function, how different types of memory units are organized and how data is processed by the processor. The interconnection and communication between the I/O units memory and processor is explained clearly and concisely. Software concepts such as programming languages, operating systems and communication protocols are discussed. With growing use of wireless to access computer networks both cellular wireless communication and WiFi (Wireless high fidelity) and WiMAX have become important. Thus it has now become part of "fundamental knowledge" and has been included. Besides this, use of computers in multimedia processing has become common place and hence is discussed. With the increase in speed of networks and consequently the Internet new computing environments such as peer to peer, grid, cloud and utility computing have emerged and will change the future of computing. Hence a new chapter on this topic has been included in this edition.

This book is an ideal text for undergraduate and post-graduate students of Computer Science and Applications (BCA and MCA), undergraduate students of engineering where computer fundamentals is a core course and for students of management who should all know the basics of computer hardware and software. It is ideally suited for working professionals who want to update their knowledge of fundamentals of computers.

**CONTENTS:** Preface. Computer Basics. Data Representation. Input-output Units. Computer Memory. Processor. Binary Arithmetic. Logic Circuits. Computer Architecture. Languages. Operating Systems. Programming Microcomputers. Computer Generations and Classification. Analog and Digital Communications. Computer Networks. Computer Graphics. Multimedia Data Acquisition and Processing. Emerging Computing Environments. References. Glossary. Index.

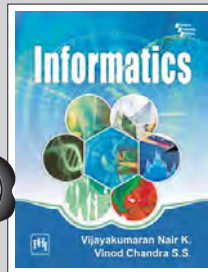
Latest Print 2011 / 452 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4011-4 / ₹ 225.00



## COMPUTER SCIENCE AND ENGINEERING

### Fundamentals/General

#### Informatics



**VIJAYAKUMARAN NAIR K.** has been Associate Professor in the Department of Zoology, Mar Ivanios College, Thiruvananthapuram, Kerala.

**VINOD CHANDRA S.S.**, Director, Computer Centre, University of Kerala, Thiruvananthapuram.

The book provides an overview of the basic concepts of informatics. Dealing with the concerns and issues of digital technology, the text has been written with the objective of introducing students with the tools and applications of information technology, highlighting its use by the digital society. It creates awareness on the nature of emerging digital knowledge society and social issues.

Organized into six chapters, the book explains the fundamentals of informatics, besides sharing and analyzing the consequences of rapid computerization. Beginning with an overview of information technology explaining evolution of computers, computer classification, computer hardware and networking, the book moves to the Internet which is considered as a knowledge repository. It then explains IPR, copyright, patents and software license agreement. The book also highlights and discusses social informatics, e-Governance, applications of informatics in various subject areas and futuristic IT.

The book is primarily intended as a text for undergraduate and postgraduate students of various disciplines wherein 'Informatics' is prescribed as a core or foundation course. The book will also be of immense use to general readers who are interested in knowing the applications of information technology.

#### KEY FEATURES

1. Provides updated information as per the course curriculum of many universities.
2. Includes labeled and immaculate illustrations for clear understanding of the concepts.
3. Chapter-end review questions to reinforce to concepts understanding and to help students prepare for examinations.
4. Presents an extensive glossary of technical terms.

**CONTENTS:** Preface. Overview of Information Technology. Knowledge Skills. Social Informatics. IT Applications. Specific Areas in Informatics. Futuristic IT. Index.

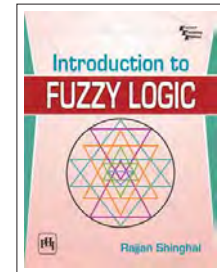


Latest Print 2014 / 240 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4988-9 / ` 250.00

PHI Learning: Publications

### Fuzzy Sets and Fuzzy Logic

#### Introduction to Fuzzy Logic



**RAJAN SHINGHAL**, formerly Professor of Computer Science, Concordia University, Montreal, Canada.

Designed primarily as a text for senior undergraduate students of Computer Science and Engineering, and postgraduate students of Mathematics and Applied Mathematics, this compact book describes the theoretical aspects of fuzzy set theory and fuzzy logic.

Based on his many years of experience, Professor Rajan Shinghal gives a succinct analysis of the procedures for fuzzy sets complementation, intersection, and union. He also explains clearly how arithmetic operations are carried out on approximate numbers, how fuzzy sets are used for reasoning, and how they are employed for unsupervised learning. Finally, the book shows how fuzzy sets are utilized in applications such as logic control, databases, information retrieval, ordering of objects, and satisfying multiple goals.

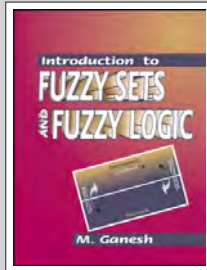
Besides students, professionals working in research organizations should find the book quite useful.

**CONTENTS:** Preface. An Overview of Crisp Sets. Basics of Fuzzy Sets. Developing Membership Functions. Complement of a Fuzzy Set. Intersection and Union of Fuzzy Sets. Fuzzy Arithmetic with Extension Principle. Fuzzy Arithmetic with Interval Analysis. Fuzzy Relations for Mapping of Fuzzy Sets. Defuzzification. Approximate Reasoning: Modus Ponens. Approximate Reasoning: Modus Tollens. Fuzzy Clustering. Fuzzy Logic Applications. Bibliography. Index.

Latest Print 2013 / 144 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4699-4 / ` 150.00



## Introduction to Fuzzy Sets and Fuzzy Logic



**M. GANESH**, Professor, Mathematics Department, Birla Institute of Technology and Science (BITS), Pilani.

Reflecting the tremendous advances that have taken place in the study of fuzzy set theory and fuzzy logic, this book not only details the theoretical advances in these areas, but also considers a broad variety of applications of fuzzy sets and fuzzy logic.

This comprehensive and up-to-date text is organized in three parts. The concepts pertaining to the “crisp” situation such as Set Theory, Logic, Switching Function Theory and Boolean Algebra are covered in Part I of the text. Part II is devoted to Fuzzy Set Theory, Fuzzy Relations and Fuzzy Logic. The applications of fuzzy set theory and fuzzy logic to Control Theory and Decision Making are designated Part III of the text.

Designed as a textbook for the undergraduate and postgraduate students of Science and Engineering, the book will also be immensely useful to practicing engineers and computer scientists.

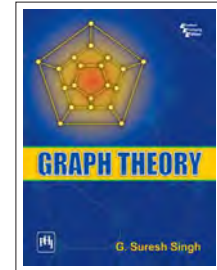
### KEY FEATURES

- Every concept has been illustrated with worked out examples.
- Fuzzy concepts have been introduced as generalizations and extensions of crisp concepts.
- Each chapter concludes with Problem Set and References.

**CONTENTS:** Preface. Acknowledgements. How to Use This Book. Part I: Classical Theories—Crisp Set Theory. Propositional Logic. Predicate Logic. Switching Functions and Switching Circuits. Boolean Algebra. Part II: Fuzzy Theories—Fuzzy Set Theory. Fuzzy Relations. Fuzzy Logic. Part III: Applications—Fuzzy Methods in Control Theory. Fuzzy Methods in Decision Making. Index.

**Latest Print 2012 / 256 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-2861-7 / ₹ 195.00**

## Graph Theory



**G. SURESH SINGH**, Reader, Department of Mathematics, University of Kerala, Trivandrum.

Graphical representations have given a new dimension to the problem solving exercise in diverse subjects like mathematics, bio-sciences, chemical sciences, computer science and information technology, social sciences and linguistics. This book is devoted to the models of graph theory, and the solutions provided by these models to the problems encountered in these diverse fields of study.

The text offers a comprehensive and coherent introduction to the fundamentals of graph theory, besides giving an application based approach to the subject. Divided into 13 chapters, the book begins with explicating the basics of graph theory, moving onto the techniques involved while drawing the graphs.

The subsequent chapters dwell onto the problems solved by the Ramsey table and Perfect graphs. The algebraic graphs and their concepts are also explained with great precision. The concluding chapters discuss research oriented methodologies carried out in the field of graph theory. The research works include the work done by the author himself such as on Union Graphs and Triangular Graceful Graphs, and their ramifications.

Primarily intended as a textbook for the undergraduate and postgraduate students of mathematics and computer science, this book will be equally useful for the undergraduate students of engineering. Apart from that, the book can be used as a reference by the researchers and mathematicians.

### KEY FEATURES

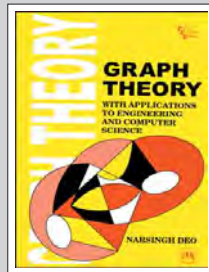
- Incorporates numerous graphical representations in the form of well-labelled diagrams
- Presents a balanced approach with the help of worked-out examples, algorithms, definitions and remarks
- Comprises chapter-end exercises to judge students' comprehension of the subject

**CONTENTS:** Foreword. Preface. Acknowledgements. Graph Theory: An Overview. Tree Graphs. Connectivity. Eulerian and Hamiltonian Graphs. Matchings and Factorizations. Graph Colourings and Enumeration. Planar Graphs. Network Flows. Ramsey Problem and Perfect Graphs. Algebraic Specifications of Graphs. Intervals and Median Graphs. Graph Labellings. Domination in Graphs. Index.

**Latest Print 2010 / 288 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-4105-0 / ₹ 250.00**



### Graph Theory with Applications to Engineering and Computer Science



**NARSINGH DEO**, *Charles E. Millican Professor, Department of Computer Science, University of Central Florida.*

Because of its inherent simplicity, graph theory has a wide range of applications in engineering and in physical sciences. It also has uses in social sciences, in linguistics and in numerous other areas. In fact, a graph can be used to represent almost any physical situation, involving discrete objects and the relationship among them. Now with the solutions to engineering and other problems becoming fairly complex leading to larger graphs, it is virtually becoming difficult to analyze problems without the use of computers.

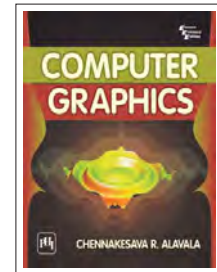
This book provides a rigorous yet informal treatment of graph theory with an increased emphasis on computational aspects of graph theory and graph-theoretic algorithms. Numerous applications to actual engineering problems are incorporated with software design and optimization topics.

**CONTENTS:** Preface. Introduction. Paths and Circuits. Trees and Fundamental Circuits. Cut-Sets and Cut-Vertices. Planar and Dual Graphs. Vector Spaces of a Graph. Matrix Representation of Graphs, Coloring, Covering, and Partitioning. Directed Graphs. Enumeration of Graphs. Graph Theoretic Algorithms and Computer Programs. Graphs in Switching and Coding Theory. Electrical Network Analysis by Graph Theory. Graph Theory in Operations Research. Survey of other Applications. Appendix A: Binet-Cauchy Theorem. Appendix B: Nullity of a Matrix and Sylvester's Law. Index.



Latest Print 2013 / 496 pp. / 15.3 × 22.9 cm  
ISBN-978-81-203-0145-0 / ₹ 250.00

### Computer Graphics



**CHENNAKESAVA R. ALAVALA**,  
*Professor in the Department of Mechanical Engineering, Jawaharlal Nehru Technological University (JNTU), Hyderabad.*

This textbook presents the basic principles for the use and design of computer graphics systems, as well as illustrates algorithm implementations and graphics applications.

The book begins with an introduction to the subject and goes on to discuss various graphic techniques with the help of several examples and neatly drawn figures. It elaborates on methods for modelling and performing geometric transformations and methods for obtaining views in both two and three dimensions. With a programming-oriented approach, the book also describes all the processes used in computer graphics along with easy-to-read algorithms, which will enable students to develop their own software skills.

#### KEY FEATURES

- Provides necessary mathematics and fundamentals of C programming used for computer graphics.
- Demonstrates the implementation of graphics algorithms using programming examples developed in C.
- Gives a large number of worked-out examples to help students understand finer details of theory.
- Presents chapter-end-exercises including multiple choice questions, fill in the blanks, and true/false type questions with answers to quiz students on key learning points.

This book is primarily designed for the students of computer science and engineering, information technology, as well as students of MSc (computer science), BCA and MCA. It will be also useful to undergraduate students of mechanical, production, automobile, electronics and electrical and other engineering disciplines.

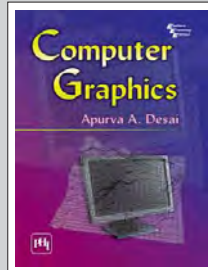
**CONTENTS:** Preface. Introduction. Graphics Hardware. Computer Graphics Primitives. Polygon Filling Algorithms. Two-dimensional Geometric Transformations. Two-dimensional Viewing. Curve Representation. Surface Representation. Solid Representation. Three-dimensional Transformations. Three-dimensional Viewing. Hidden Surface/Line Removal Methods. Illumination Models and Rendering Methods. Computer Animation. Appendix A: Essential Mathematics for Computer Graphics. Appendix B: C Programming for Computer Graphics. Bibliography. Answers. Index.

Latest Print 2014 / 352 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3876-0 / ₹ 295.00



**Computer Graphics**

**APURVA A. DESAI,**  
Professor and Head, Department of  
Computer Science, Veer Narmad  
South Gujarat University, Surat.



This text not only covers all topics required for a fundamental course in computer graphics but also emphasizes a programming-oriented approach to computer graphics. The book helps the students in understanding the basic principles for design of graphics and in developing skills in both two- and three-dimensional computer graphics systems.

Written in an accessible style, the presentation of the text is methodical, systematic and gently paced, covering a range of essential and conceivable aspects of computer graphics, which will give students a solid background to generate applications for their future work.

The book, divided into 11 chapters, begins with a general introduction to the subject and ends with explaining some of the exciting graphics techniques such as animation, morphing, digital image processing, fractals and ray tracing. Along the way, all the concepts up to two-dimensional graphics are explained through programs developed in C.

This book is intended to be a course text for the B.Tech/M.Tech students of Computer Science and Engineering, the B.Tech students of Information Technology and the M.Sc. students pursuing courses in Computer Science, Information Science and Information Technology, as well as the students of BCA and MCA courses.

**KEY FEATURES**

- Fundamentals are discussed in detail to help the students understand all the needed theory and the principles of computer graphics.
- Extensive use of figures to convey even the simplest concepts.
- Chapter-end exercises include conceptual questions and programming problems.

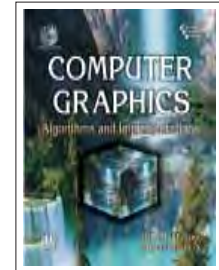
**CONTENTS:** Foreword. Preface. Acknowledgements. Overview of Computer Graphics. Mathematical Foundation for Computer Graphics. Graphics Primitives. Polygons. Geometric Transformations. Viewing in Two Dimensions. Graphics in Three Dimensions. Hidden Surfaces. Colours and Shading. Graphics Standards. Introduction to Advanced Graphics Techniques. Index.

Latest Print 2014 / 364 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-3524-0 / ₹ 425.00

**Computer Graphics:  
Algorithms and  
Implementations  
(with CD-ROM)**

**D.P. MUKHERJEE,** Professor,  
Indian Statistical Institute,  
Kolkata.

**DEBASISH JANA,** Principal  
Consultant with the IT Dept of  
Simplex Infrastructures Limited, Kolkata.



Intended as a textbook on graphics at undergraduate and postgraduate level, the primary objective of the book is to seamlessly integrate the theory of Computer Graphics with its implementation. The theory and implementation aspects are designed concisely to suit a semester-long course. Students of BE/B Tech level of Computer Science, Information Technology and related disciplines will not only learn the basic theoretical concepts on Graphics, but also learn the modifications necessary in order to implement them in the discrete space of the computer screen. Practising engineers will find this book helpful as the C program implementations available in this book could be used as kernel to build a graphics system. This book is also suitable for the students of M.Sc. (Computer Science) and Computer Applications (BCA/MCA). To suit the present day need, the C implementations are done for Windows operating system exposing students to important concepts of message-driven programming. For wider acceptability, Dev C++ (an open source integrated windows program development environment) versions of the implementations of graphics programs are also included in the companion CD-ROM.

This book introduces the students to Windows programming and explains the building blocks for the implementation of computer graphics algorithms. It advances on to elaborate the two-dimensional geometric transformations and the design and implementation of the algorithms of line drawing, circle drawing, drawing curves, filling and clipping. In addition, this well-written text describes three-dimensional graphics and hidden surface removal algorithms and their implementations. Finally, the book discusses illumination and shading along with the Phong illumination model.

**CONTENTS:** Preface. Introduction to Windows Programming. Two-dimensional Geometric Transformations. Line Drawing Algorithms. Circle Drawing. Drawing Curves. Filling Algorithms. Clipping Algorithms. Three-dimensional Graphics. Hidden Surface Removal. Illumination and Shading. Suggested List of References. Index

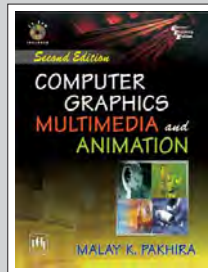
Latest Print 2010 / 640 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4089-3 / ₹ 395.00



### Computer Graphics, Multimedia and Animation, 2nd ed. (with CD-ROM)

**MALAY K. PAKHIRA,**

*Associate Professor in the Department of Computer Science and Engineering, Kalyani Government Engineering College, Kalyani, West Bengal.*



This book, now in its second edition, will help students build sound concepts which underlie the three distinct but related topics of Computer Graphics, Multimedia and Animation. These topics are of utmost importance because of their enormous applications in the fields of graphical user interfaces, multimedia and animation software development.

The treatment of the text is methodical and systematic, and it covers the basic principles for the use, design and implementation of computer graphics systems with a perfect balance in the presentation of theoretical and practical aspects. The second edition introduces the basics of fractal geometry and includes a companion CD containing a number of C programs to demonstrate the implementation of different algorithms of computer graphics.

*Some of the outstanding features of the book are:*

- **Algorithmic Presentation:** Almost all the processes, generally used in computer graphics, are described along with easy-to-read algorithms. These help students master basic concepts and develop their own software skills.
- **Clear Illustrations:** Descriptions of different devices and processes are illustrated with more than 250 neatly drawn figures.
- **Solved Problems:** Numerous solved problems and chapter-end exercises help students grasp finer details of theory.
- **Advanced Topics:** Chapter 6 includes schematics and algorithms to develop a display file based graphical system. Chapter 16 includes organizations of different types of commonly used graphic and image files.

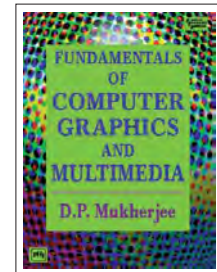
This text is primarily designed to meet the curriculum needs of courses in Computer Graphics and Multimedia for students pursuing studies in Computer Science and Engineering, Information Technology and Computer Applications.

**CONTENTS:** Preface. Introduction. Graphical Input-Output Devices. Scan Conversion. Scan Conversion of Solids. 2-D Geometrical Transformations. Display Files and Segments. 3-D Geometrical Transformations. Projection. 2-D Viewing and Clipping. 3-D Viewing and Clipping. Curve Design. Hidden Surface Elimination. Light, Shades and Colours. Multimedia Basics. Virtual Reality. Graphic Image File Formats. Animation and Flash Overview. Bibliography. Index.

**Latest print 2013 / 420 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-4127-2 / ₹ 350.00**



### Fundamentals of Computer Graphics and Multimedia



**D.P. MUKHERJEE,** *Professor, Indian Statistical Institute, Kolkata.*

Intended as a textbook for students of computer science and management, this study strives to bring the concept of multimedia and computer graphics into a single volume. The book covers most of the scan conversion algorithms and other necessary ingredients for realistic rendering, such as techniques of image clipping, illumination and shading. It lays down the fundamental principles of computer graphics and provides the methodologies and algorithms, which act as building blocks of advanced animation and rendering techniques. The emphasis is clearly on explaining the techniques and the mathematical basis.

The book also gives an introductory level description on graphics and audio and video hardware, which is sufficient for understanding some of the intricacies in these fields. Since graphics are best learnt with the help of computer implementation of the graphics algorithm, the pseudo-codes and problems at the ends of chapters will encourage readers to implement some of the interesting applications of graphics.

#### KEY FEATURES

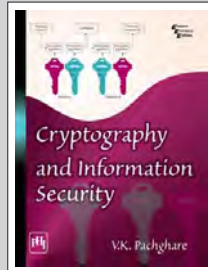
- Deals with the fundamentals of computer graphics and multimedia in a concise but reasonable manner.
- Devotes a separate chapter to animation techniques and a section on virtual reality.
- Provides a feel of the frontiers of computer graphics and multimedia for advanced reading.
- Serves as concise text for DOEACC A level computer graphics course.

**CONTENTS:** Preface. Applications. Graphic Devices. Drawing Geometry. Conics and Curves. Graphic Operations. 3D Graphics. Illumination and Shading. Tweening and Morphing. Graphic Standards. Multimedia. Appendix. Suggested Further Reading. Index.

**Latest Print 2014 / 192 pp. / 16.0 × 24.1 cm**  
**ISBN-978-81-203-1446-7 / ₹ 175.00**



## Cryptography and Information Security



**V.K. PACHGHARE**, Assistant Professor, Department of Computer Engineering and Information Technology, Government College of Engineering, Pune.

This well-organized text presents the principles, techniques, design, and implementation of cryptography and information security algorithms, with a perfect balance in the presentation of theoretical and practical aspects. To provide the mathematical background required to understand the principles of cryptography and information security, the text explains all the relevant theorems such as Fermat's theorem and Euler's theorem. The book gives a clear analysis of various encryption methods and cipher techniques. In addition, various security measures, for example, firewalls and virtual private network, and web security, are also discussed.

### KEY FEATURES

- Covers the latest topic of computer forensics and the areas in which they can be applied.
- Gives algorithms with numerical explanations.
- Provides a large number of solved problems.

The book is intended for the undergraduate and postgraduate students of computer science and engineering (B.Tech./M.Tech.), undergraduate and postgraduate students of computer science (B.Sc./M.Sc. Computer Science), and information technology (B.Sc./M.Sc. IT) and the students of Master of Computer Applications (MCA).

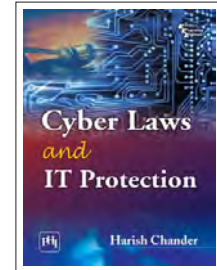
**CONTENTS:** Preface. Introduction. Data Encryption Techniques. Data Encryption Standards. Advanced Encryption Standards. Symmetric Ciphers. Number Theory. Public Key Cryptosystems. Key Management. Authentication. Digital Signatures. Electronic Mail Security. IP Security. Web Security. Intrusion. Malicious Software. Firewall. Computer Forensics. Bibliography. Index.

Latest Print 2013 / 384 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3521-9 / ₹ 295.00



## Cyber Laws and IT Protection



**HARISH CHANDER**, formerly Professor-in-Charge, Law Centre II, Faculty of Law, University of Delhi.

India has emerged as a hub of the IT industry due to the phenomenal growth of the IT sector. However, this huge growth rate has brought with it the inevitable legal complications due to a switch over from paper-based commercial transactions to e-commerce and e-transactions. This book discusses the legal position of Information Technology (IT), e-commerce and business transaction on the cyberspace/Internet under the Information Technology (IT) Act in India.

Divided into five parts, the text deals with the role of the Internet, e-commerce and e-governance in the free market economy. It elaborates on various laws relating to electronic records and intellectual property rights with special reference to India. It describes various rules and regulations which have been introduced to get rid of cyber crimes. It also discusses various offences committed under the IT Act, penalties imposed on the offenders, and compensations awarded to the victims. The text also acquaints the students with the miscellaneous provisions of the IT Act.

This book is designed as text for postgraduate students of Law (LLM) and undergraduate and postgraduate students of Information Technology [B.Tech./M.Tech. (IT)] and for Master of Computer Applications (MCA) wherever it is offered as a course. Besides, it will prove handy for scholars and researchers working in the field of IT and Internet.

**CONTENTS:** Preface. Acknowledgements. Table of Cases. Abbreviations (Citation of Cases). Part I: Internet, E-commerce and E-governance with Reference to Free Market Economy—Understanding Computers, Internet and Cyber Laws. Conceptual Framework of E-commerce: E-governance. The Role of Electronic Signatures in E-commerce with Reference to Free Market Economy in India. Part II: Law Relating to Electronic Records and Intellectual Property Rights in India—Legal Aspects of Electronic Records/Digital Signatures. The Rules and Regulations of Certifying Authorities in India. Protection of Intellectual Property Rights in Cyberspace in India. Part III: International Efforts Relating to Cyberspace Laws and Cyber Crimes—International Efforts Related to Cyberspace Laws. Council of Europe (COE) Convention on Cyber Crimes. Part IV: Penalties, Compensation and Offences under the Cyberspace and Internet in India—Penalties, Compensation and Adjudication of Violations of Provisions of IT Act and Judicial Review. Some Important Offences under the Cyberspace Law and the Internet in India. Other Offences under the Information Technology Act in India. Part V: Miscellaneous Provisions of IT Act and Conclusions—The Role of Electronic Evidence and the Miscellaneous Provisions of the IT Act. Appendices— I: Information Technology Act as Amended up to 2008. II: The Information Technology (Certifying Authorities) Rules, 2000. III: Ministerial Order on Blocking of Websites. IV: The Information Technology (Use of Electronic Records and Digital Signatures) Rules, 2004. Bibliography. Index.

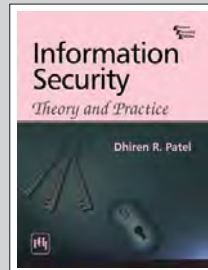
Latest Print 2013 / 284 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-4570-6 / ₹ 325.00



## Information Security: Theory and Practice

**DHIREN R. PATEL**, *Professor of Computer Engineering at National Institute of Technology, Surat (India).*



This book offers a comprehensive introduction to the fundamental aspects of Information Security (including Web, Networked World, Systems, Applications, and Communication Channels). Security is also an essential part of e-business strategy (including protecting critical infrastructures that depend on information systems) and hence information security in the enterprise (Government, Industry, Academia, and Society) and over networks has become the primary concern. The book provides the readers with a thorough understanding of how information can be protected throughout computer networks.

The concepts related to the main objectives of computer and information security systems, namely confidentiality, data integrity, authentication (entity and data origin), access control, and non-repudiation have been elucidated, providing a sound foundation in the principles of cryptography and network security. The book provides a detailed treatment of design principles of classical and modern cryptosystems through an elaborate study of cryptographic techniques, algorithms, and protocols. It covers all areas of security—using Symmetric key and Public key cryptography, hash functions, authentication techniques, biometric techniques, and steganography. Besides, techniques such as Secure Socket Layer (SSL), Firewalls, IPSec for Web security and network security are addressed as well to complete the security framework of the Internet. Finally, the author demonstrates how an online voting system can be built, showcasing information security techniques, for societal benefits.

*Information Security: Theory and Practice* is intended as a textbook for a one-semester course in Information Security/ Network Security and Cryptography for B.E./B.Tech students of Computer Science and Engineering and Information Technology.

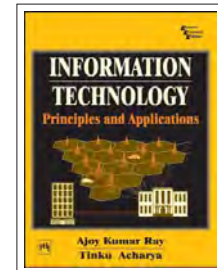
**CONTENTS:** Preface. Overview of Information Security and Cryptography. Classical Encryption Methods. Confidentiality: Symmetric Key Cryptography. Information Hiding: Steganography. Confidentiality: Public Key Cryptography. Data Integrity: Cryptographic Hash Functions. Authentication. Authentication/Identification: Biometrics. Virus and Malware. Web and Network Security: SSL and IPSec. E-Voting: Online (Internet-based) Electronic Voting Systems. Glossary. References. Index.

Latest Print 2010 / 312 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3351-2 / ₹ 295.00

PHI Learning: Publications

## Information Technology: Principles and Applications

**AJOY KUMAR RAY**, *Professor at Department of Electronics and Electrical Communication Engineering, IIT Kharagpur.*



**TINKU ACHARYA**, *Senior Executive Vice President and Chief Science Officer of Avisere Inc., Tucson, Arizona, USA. He is also an Adjunct Professor in the Department of Electrical Engineering, Arizona State University, USA.*

This comprehensive yet accessible text provides a good introduction to the fundamental concepts of Information Technology and skillfully elaborates on their applications, covering in the process the entire spectrum of IT related topics.

Organized into three parts, the book offers an insightful analysis of the subject, explaining the concepts through suitable illustrations. It is intended for undergraduate and postgraduate students of information technology, computer science as well as electronics and electrical communication engineering. It should also serve as an excellent reference for professionals in the IT field.

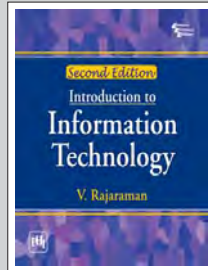
**CONTENTS:** Foreword 1. Foreword 2. Preface. Acknowledgements. Contributors. Part I: Core Concepts and Issues—Introduction. Database Management Systems. Role of Telecommunication in Information Technology. Basics of the Internet. Overview of Present Day Networking Technologies. Principles of Visual Information Analysis. Information Technology for Multimedia Communication. Part II: Development of Information Systems—Graph-Theoretic Structure of the World Wide Web. Principles of Image Compression. Text Compression. Content-based Multimedia Analysis and Retrieval. Speech and Audio Compression. All-Optical Networking and Evolution of Network Infrastructure: From Electrical to Optical. Computer Security Threats and Countermeasures. Image Databases. Principles and Applications of Soft Computing. An Introduction to Clustering Techniques. Part III: Important Application Areas of IT—Bioinformatics: Issues and Challenges. Information Technology in Healthcare and Telemedicine. An Overview of Remote Sensing and GIS Techniques. E-commerce: A Source of Competitive Advantage in Global Market. An Investigation into the Emerging 'Cybermediary' Concept. Industrial Information Technology. Colour Image Processing and Analysis. Information Technology in Mining and Electrical Load Forecasting. Information Processing from Document Images. Information Technology for Rural Development. Appendix—Projects for IT Courses. Index.

Latest Print 2011 / 628 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2184-7 / ₹ 550.00

## COMPUTER SCIENCE AND ENGINEERING

### Information Technology

#### Introduction to Information Technology, 2nd ed.



**V. RAJARAMAN**, *Honorary Professor in the Supercomputer Education and Research Centre, Indian Institute of Science, Bangalore.*

This textbook is designed for a first course in Information Technology (IT), offered as core course for all undergraduate university students. It will also benefit students preparing for DOEACC (O level), polytechnic students, and professional courses such as CA. As IT is a rapidly advancing technology, the main objective of this book is to emphasize reasonably stable fundamental concepts on which this technology is built.

The book is broadly organized into three parts. The first part describes the hardware devices used for acquisition of numerical, graphical, audio and video data and their representation in binary form. The second part describes the methods of storing, processing and disseminating data. The final part describes both the systems and application software. Applications include word processors, spreadsheets, multimedia processing, some uses of the Internet, business processes and e-commerce. The concluding chapter presents a discussion of social networks, social impacts of Information Technology and career opportunities in the field of IT.

#### KEY FEATURES

- Provides comprehensive coverage of IT from first principles
- Describes a large number of important applications of IT
- Explains acquisition, storage, organization, processing, display, and dissemination of multimedia data
- Covers business data processing, the Internet and World Wide Web, e-commerce, social impacts of IT and job opportunities in IT enabled services
- Every chapter begins with a statement of learning goals and ends with a comprehensive summary.

**CONTENTS:** Preface. Data and Information. Acquisition of Numbers and Textual Data. Acquiring Graphical Data. Acquiring Audio Data. Acquisition of Video. Data Storage. Central Processing Unit. Computer Networks. Output Devices. Computer Software. Data Organization. Processing Numerical Data. Processing and Displaying Textual Data. Processing Multimedia Data. Some Internet Applications. Business Information Systems. Electronic Commerce. Societal Impacts of Information Technology. References. Index.

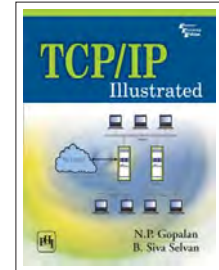


Latest Print 2014 / 384 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4731-1 / 295.00

#### TCP/IP Illustrated

**N.P. GOPALAN**, *Professor, Department of Computer Applications, National Institute of Technology, Tiruchirappalli, Tamil Nadu.*

**B. SIVA SELVAN**, *Research Scholar, Department of Computer Science and Engineering, National Institute of Technology, Tiruchirappalli, Tamil Nadu.*



The TCP/IP technology has evolved over the years and undergone substantial improvements to meet the demands of modern high-speed network technologies. These demands involve the handling of increased traffic, providing better and efficient services, and implementing foolproof security measures for authentic and safe communication.

Offering clear explanations of underlying issues, this book provides an accessible introduction the basic principles of the Internet and its accompanying TCP/IP protocol suit. It discusses a wide range of topics, including:

- Principles and applications of TCP/IP and other relevant protocols
- Coordination of multiple inter-connected physical networks and protocols
- Routing and its specific components—Internet addressing, protocol layering and implementation
- Client-server model of communication
- Internet security—issues and concepts

This textbook is designed for students of BE/BTech pursuing courses in Computer Science and Engineering, Information Technology, as well as for students of computer applications (BCA and MCA). It can also be a valuable reference for ME/MTech students of Computer Science and Engineering and Information Technology, specializing in computer networks and network programming.

**CONTENTS:** Preface. Acknowledgements. Introduction. Network Technologies Revisited. Internet Architecture and Concepts. Address Resolution Protocols. Reverse Address Resolution Protocol (RARP). Connectionless Datagram. Datagram Routing. Internet Control Message Protocol (ICMP). Subnet and Classless Addressing Principles. Protocol Organization. User Datagram Protocol (UDP). Transmission Control Protocol—Reliable Services. Routing Algorithms. Exterior Gateway Protocols for Routing. Autonomous Systems Routing. Multicasting Over the Internet. TCP/IP over ATM Networks. Mobile IP. Private Network Connections—VPN and NAT. Client Server Interaction. Socket Interface. Automatic Configuration and Boot Strapping. Domain Name System (DNS). Telnet and Remote Login Applications. File Transfer Protocol (FTP). Electronic Mail (E-mail). World Wide Web (WWW) and HTTP. Voice and Video Over IP (VOIP). Internet Security. IPv6—The Future of TCP/IP. List of Networking Terms. Bibliography. Index.

Latest Print 2008 / 308 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3283-6 / 250.00



## Developing Web Applications Using ASP.NET and Oracle, 2nd ed. (with CD-ROM)

**PRANAB KUMAR DAS GUPTA**, *Senior Scientist in Defence Research and Development Organization (DRDO). Presently he is Additional Director at Proof and Experimental Establishment, Chandipur, Balasore, Odisha.*

**RAMPROSAD MONDAL** *is a Microsoft Certified Technology Specialist (MCTS) specialized in ASP.NET. He is a corporate trainer in Microsoft Technologies.*

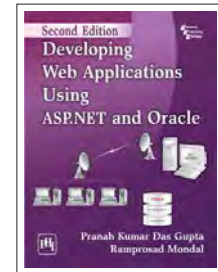
This thoroughly revised and updated Second Edition provides an in-depth information that readers need to fully exploit the functionality of Microsoft's ASP.NET framework and Oracle's Database Server to build dynamic and interactive web applications that can handle a large number of simultaneous users.

The book provides readers with information pertaining to ASP.NET 4.0 architecture; its installation, web controls, master pages, themes, state management, AJAX and deployment of web applications. It includes the Hypertext Markup Language (HTML) and the Cascading Style Sheet (CSS), which are used for designing the web pages. In order to facilitate an easy learning of intricate concepts involved in the development of data-driven dynamic web applications, the book provides a detailed treatment on the Oracle Structured Query Language (SQL) and Oracle PL/SQL. It also introduces the distributed architecture and discusses how ASP.NET framework, Oracle database and Internet Information Services (IIS) can be used to develop and deploy the solutions for distributed environment.

**After going through this book, the students/professionals will be able to:**

- Develop data-driven web applications using Oracle as back-end.
- Present data through data-bound controls.
- Manage consistent look and fill using master pages and themes.
- Develop stateful e-commerce applications.
- Develop rich interactive web applications using AJAX.
- Embed Microsoft Reports to produce dynamic printable output.
- Debug, deploy and secure web applications.

The book is intended to serve as a guide for the undergraduate and postgraduate students of Computer



Science, Computer Applications and Information Technology. Besides, it would also be useful to IT professionals to enhance their technical skills.

### KEY FEATURES

- More than 100 worked-out examples and 20 assignments.
- Around 200 objective and subjective type questions.
- Two real-world case studies with solutions.
- Project development work following the complete SDLC process model.
- Three appendices, namely Integrating Microsoft Reports in ASP.NET, Installation of Visual Studio 2010, and Answers to Chapter-end Practice Questions.

### NEW TO THE SECOND EDITION

- Provides information for designing and developing the web applications using Visual Studio.
- Includes two new chapters—one on Master Pages, Themes and State Management and the other on AJAX in ASP.NET and Web Deployment of Application.
- Includes the new features of ASP.NET 4.0.
- Gives additional questions in each chapter.
- Includes a CD-ROM, which contains programs (tested with ASP.NET 4.0 and compatible with Oracle 10g) corresponding to all the examples, assignments, case studies and the project included in the book. The installation processes of programs are described in the relevant chapters of the book.

**CONTENTS:** Preface. Acknowledgements. Introduction to ASP.NET and Distributed Architecture. Hypertext Markup Language. Structured Query Language Specific to ASP.NET. Oracle PL/SQL Specific to ASP.NET. Web Controls. Validation, Menu, Cookies and Login Controls. Data Controls. Master Pages, Themes and State Management. AJAX in ASP.NET and Web Deployment of Application. Case Studies. Project: System Requirement Specification. Project: Designing and Coding. Appendices—A: Integrating Microsoft Reports in ASP.NET. B: Installation of Visual Studio 2010. C: Answers to Chapter-end Practice Questions. Index.

Latest Print 2013 / 464 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4732-8 / ₹ 525.00



## Essentials of E-Commerce Technology

**V. RAJARAMAN**, *Honorary Professor in the Supercomputer Education and Research Centre, Indian Institute of Science, Bangalore.*



This book is designed to acquaint the readers with major aspects of e-commerce with particular emphasis on technology such as cryptography, e-payment and mobile payment security.

The book presents a layered architecture of e-commerce systems with six layers. The physical layer (the bottommost layer) described first, provides the basic communication infrastructure needed by e-commerce. The next layer described is the logical layer consisting of Local Area Networks, the Internet, Intranet, etc. which provide connectivity. The layer above is the network services layer which provides e-mail and World Wide Web applications. Above this is a very important messaging layer of e-commerce which provides facilities for exchanging messages securely using the communication infrastructure. Here various methods of encryption, public key infrastructure and digital signature are discussed. It is also explained as to how the messaging layer is used to exchange structured electronic documents, using XML. The next layer called middleman services layer, describes the design of home page of an organization and elaborates various payment services such as credit card, e-cash, smart card, etc. The topmost layer is on applications, namely, B2C, B2B and C2C e-commerce which are defined and described at the beginning of the book.

As use of mobile phones and mobile network is rapidly increasing, a whole chapter is devoted to explain m-commerce. Of special interest are detailed discussions of Wireless Application Protocol, security issues and payment methods. A complete chapter is also devoted to new developments in multimedia information goods such as e-books, MP3 compressed audio and digital quality video. A unique feature of these goods is the method of delivery which also uses the mobile Internet infrastructure. The legal framework of e-commerce is also provided—the Information Technology Act 2000 (and the amended act of 2008) is explained.

This book with its numerous student-friendly features is an ideal text for undergraduate and postgraduate students of Computer Science and Information Technology (BSc and MSc), Computer Applications (BCA and MCA), and for undergraduate engineering students of Computer Science and Engineering and Information Technology.

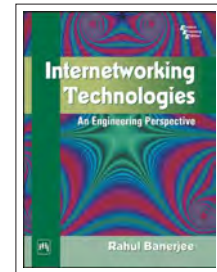
**CONTENTS:** Preface. What is Electronic Commerce? Infrastructure for E-Commerce. Communication Networks for E-Commerce. Network Services. Secure Messaging. Payment Systems in E-Commerce. Structured Electronic Documents. M-Commerce. E-Commerce of Multimedia. Legal Framework of E-Commerce. References. Answers to Objective Questions. Index.



Latest Print 2011 / 260 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3937-8 / 250.00

## Internetworking Technologies: An Engineering Perspective

**RAHUL BANERJEE** is with the *Computer Science and Information Systems Group at BITS, Pilani.*



Designed as an advanced text on internetworking technologies for senior undergraduate/graduate students of computer science, this unique book provides an introduction to the key concepts related to front line areas of internetwork-specific research and development. The text would also be highly useful to professionals, who wish to keep abreast of various state-of-the-art technologies in their fields of research.

### SALIENT FEATURES

- Offers a simple yet clear view of implications of design-time choices on the evolution of internetwork protocols, design and architectures.
- Allows a unified treatment of complex subjects by means of identification of common threads.
- Design exercises at the end of relevant chapters extend the coverage of the text by addressing real-world design issues and developing a fuller view of the domain.
- Focuses on the IPv6 and design and implementation issues specific to the next-generation internetworking using IPv6 as their base technology.
- Proposed solutions to the IPv6 quality-of-service specification problems, discussed in the appendices, provide an insight into several approaches of contemporary significance.

Supporting website (<http://www.bits-pilani.ac.in/~rahul/>) maintained by the author provides several supporting tools for the readers.

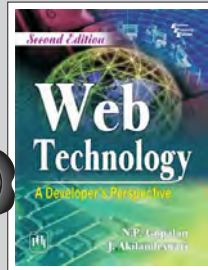
**CONTENTS:** Preface. Part I: Fundamentals of Internetworking, Multimedia, Compression and Intelligent Agent Technology—Introductory Concepts in Internetworking, Multimedia Internetworking Technology, Data Compression Technology, Intelligent Agent Technology in Internetworking. Part II: Internetworking System Architectures—The TCP/IPv6 Internetworking Architecture, Internetworking Routing Architectures, Internetwork Management Architectures, Internet Security Architectures. Part III: Internetworking Application Architectures—Internetwork-based Video-on-Demand Architectures, Internetwork-based Digital Library Architectures, Internet-commerce Architectures, Internet Programming, Appendices, Bibliography, Index.

Latest Print 2013 / 264 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-2185-4 / 225.00

## COMPUTER SCIENCE AND ENGINEERING

### Internet Technology

**Web Technology:  
A Developer's  
Perspective,  
2nd ed.**



**N.P. GOPALAN**, Professor in the Department of Computer Applications, National Institute of Technology, Tiruchirappalli.  
**J. AKILANDESWARI**, Professor and Head, Department of Information Technology, Sona College of Technology, Salem.

This well-received book, now in its second edition, incorporates a new chapter on PHP as Chapter 13 based on the readers' demand in today's world PHP which is an important web programming technology.

This text provides students with a comprehensible introduction to the programming and scripting languages currently used to create Web sites and Web applications—the main aim being to teach the programming concepts of various Web technologies and the fundamentals needed to program on the Internet.

The book emphasises the underlying fundamentals of Web page development and prepares students to build real-world, industrial strength Web-based applications, and use a wide variety of Web development tools effectively and efficiently. Students are introduced to the concepts of Internet Protocols, Java networking, JavaScript, VBScript and PHP. The material presented on Java network programming contains an elaborate description with examples to help the reader clearly understand the networking concepts.

The book is intended as a text for students of Computer Science and Engineering, Information Technology, and Master of Computer Applications.

#### KEY FEATURES

- Presents well-designed material on HTML, DHTML, XML and PHP with many practical exercises.
- Explains the development of servlets with simple examples.
- Explores the programming features of JSPs.
- Introduces the elements of ASPs with worked-out exercises.
- Includes Review Questions and Objective Type Questions at the end of each chapter.

**CONTENTS:** Preface. Introduction. Internet Protocols. Java Network Programming. HTML. JavaScript. VBScript. Dynamic HTML (DHTML). Extensible Mark-up Language (XML). Common Gateway Interface (CGI). Servlets. Java Server Pages (JSP). Active Server Pages (ASP). PHP. Index.

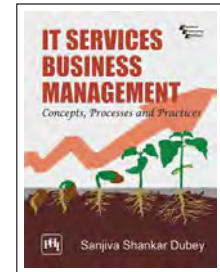
Latest Print 2014 / 348 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-5006-9 / ₹ 325.00



PHI Learning: Publications

### IT Management

**IT Services Business  
Management:  
Concepts, Processes  
and Practices**



**SANJIVA SHANKAR DUBEY**  
is an expert on IT strategy and Innovation. He has spent over 25 years in IT while working with IBM and Tata Steel.

In IT Services, the businesses are managed with a customer-centric approach. This book, through various concepts, processes and stages, explores the need and framework of IT Services business, and how they are managed to deliver services par excellence.

The book comprehensively explains how ITSE (IT Services Enterprises) strategies are analyzed and formulated with the help of three-dimensional cube—customer-centricity, niche vs. end-to-end offering and disruptive innovation vs. gradual innovation. The book further teaches that a good marketing must start with an integrative vision of the ITS Enterprise, and reveals how a customer plays a dominant role in co-creating IT Services. It also details on the various stages of sales cycle called Sales funnel, and how the sales team manages the sales opportunity's progress.

The concluding chapters discuss the aspects needed for the survival and growth of the ITSE firms; the factors that propel growth—Demand, Quality of the business environment and Supply response of an enterprise. It also shows how the future of the IT Services depend on the combination of—Business environment, Information and Communication Technology (ICT) trends, IT Services business model trends and IT governance trends.

The book is well-supported with the diagrams and illustrations to explain the concepts clearly. The Review Questions are also incorporated to analyze the students' learning skills.

The book is intended for the postgraduate students of business administration, MCA and MSc (IT). Besides, the book will also be beneficial for the IT Services executives and managers.

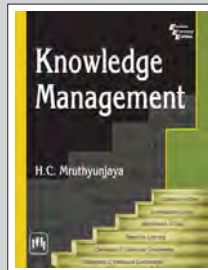
**CONTENTS:** Preface. IT Services Industry Landscape. IT Services Portfolio. IT Services Business Processes, Models and Functions. Strategic Foundation for IT Services Business. Marketing of IT Services. Business Development of IT Services. IT Services Selling. Delivery Management of IT Services. IT Services Quality Assurance. IT Services Enterprise: Measurement and Driving performance. Creating a Winning IT Services Team. Managing Knowledge, Innovation and Creating a Learning Organization. Managing IT Services Enterprise Growth. Future Trends in IT Services. Index.

Latest Print 2012 / 280 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4531-7 / ₹ 250.00



## Knowledge Management

**H.C. MRUTHYUNJAYA,**  
*Consultant (Corporate Systems)*  
*-serving various organizations.*  
*Elected as a Life Member of*  
*Indian Academy of Wood Science.*



For ensuring sustainable success in a competitive global market scenario, business enterprises are seeking for their own latent knowledge treasures. This book explicitly explains how stringent strategies and practices emphasized under knowledge management can help streamline organization and its resources.

Divided into ten chapters the book elaborates on the concepts, theories and principles governing knowledge management. Beginning with history and evolution of knowledge, and its growth and impact on the society, it further explains the role of knowledge management towards Corporate Social Responsibility (CSR). The chapters on *Managing Competitiveness* and *Managing Knowledge Force* discuss how innovative business strategies can help to achieve new landmarks, and how the employees of an organization can turn into a knowledge force and achieve success by churning out profit.

The concluding chapters highlight two important aspects of knowledge management, certainty management and uncertainty control. The chapters discuss how an organization can flourish by predicting and controlling the uncertainties and managing the obvious situations.

The highlight of this book is the inclusion of **well-analyzed live cases**. All the cases demonstrate how seemingly impossible tasks can be successfully handled with an efficient handling of knowledge management principles and practices.

Primarily intended for the students of management, this book can also prove beneficial to the practising managers.

### KEY FEATURES

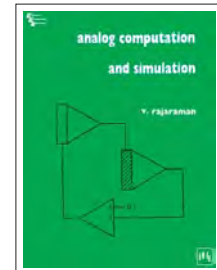
- Presents a global picture of knowledge management in practice in live shop-floors
- Incorporates around 550 classified audit probe questions embracing various areas of knowledge management
- Illustrates the concepts, principles and practices of knowledge management with well-labelled figures, tables and boxes

**CONTENTS:** Preface. Knowledge Management Systems. Knowledge Profile. Knowledge Management and Corporate Social Responsibility. Designing Knowledge Management Systems. Auditing Knowledge Management Systems. Managing Competitiveness. Managing Success. Managing Knowledge Force. Certainty Management. Uncertainty Control. Index.



Latest Print 2011 / 740 pp. / 17.8 × 23.5 cm  
 ISBN-978-81-203-4178-4 / ` 495.00

## Analog Computation and Simulation



**V. RAJARAMAN,** *Honorary Professor, Supercomputer Education and Research Centre, Indian Institute of Science, Bangalore.*

This is a book on techniques of using analog computers for solving differential equations and for simulating dynamic systems. It presents analog computers to those with little background in electronics. Some knowledge of ordinary differential equations and basics of physics is the only requirement to understand most of the book.

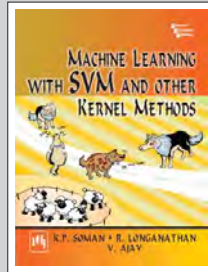
The numerous examples in the text illustrate scaling of analog computers for solving both linear and non-linear problems. Systematic methods of checking analog computer solutions, and iterative analog computations are also outlined.

This book is intended for use in colleges for introductory courses on analog computation. The subject matter of the text is also useful in courses relating to continuous systems simulation; as an adjunct text for signal systems, control systems, chemical process control, mechanical vibrations and dynamics, this book is very beneficial.

**CONTENTS:** Preface. Introduction. Linear Computing Circuits. Time Scaling. Amplitude Scaling. Combined Time and Amplitude Scaling. Systematic Checking of Computer Solutions. Simulation of Transfer Functions. Applications of Multipliers. Non-linear Function Generators. Iterative Operation of Analog Computers. Digital Simulation of Analog Computation. Appendix—Laboratory Exercises. Index.

Latest Print 1995 / 200 pp. / 21.6 × 27.8 cm  
 ISBN-81-203-0011-4 / ` 85.00

### Machine Learning with SVM and Other Kernel Methods (with CD-ROM)



**K.P. SOMAN**, Head, *Centre for Excellence in Computational Engineering and Networking, Amrita Vishwa Vidyapeetham, Coimbatore.*

**R. LOGANATHAN**, *Research Associate, Centre for Excellence in Computational Engineering and Networking, Amrita Vishwa Vidyapeetham, Coimbatore.*

**V. AJAY**, *Senior Lecturer, Centre for Excellence in Computational Engineering and Networking, Amrita Vishwa Vidyapeetham, Coimbatore.*

Support vector machines (SVMs) represent a breakthrough in the theory of learning systems. It is a new generation learning system based on recent advances in statistical learning theory.

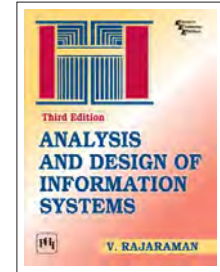
Designed for the undergraduate students of computer science and engineering, this book provides a comprehensive introduction to the state of the art algorithm and techniques in this field. It covers most of the well known algorithms supplemented with code and data. One Class, Multiclass and hierarchical SVMs are included which will help the students to solve any pattern classification problems with ease and that in Excel.

- The CD accompanying the book includes animations on solving SVM training problem in Microsoft EXCEL and by using SVM<sup>Light</sup> software. In addition, Matlab codes is given for all the formulations of SVM along with the data sets mentioned in the exercise section of each chapter.

**CONTENTS:** Preface. Machine Learning with Support Vector Machines. Supervised Automatic Learning—Probabilistic Framework. Essential Mathematical Background. Kernel Methods and the Evolution of SVM. Support Vector Regression. Simple Variants of SVM—Mangasarian's Approaches. Sequential Minimization Algorithms (SMO). One Class SVM. Multiclass and Hierarchical Support Vector Machines. String Kernels. Kernel Based Methods for Clustering Data. Data Sets. Other Kernel Methods K-PCA, K-CCA, K-PLS, K-ICA. Kernel Methods for Text Categorization. Kernel Methods for Speech Recognition. Kernel Methods in Natural Language Processing—An Introduction. Appendix A: Popular SVM Tools. Appendix B: Biosketch of Scientists. Index.

Latest Print 2011 / 496 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3435-9 / 425.00

### Analysis and Design of Information Systems, 3rd ed.



**V. RAJARAMAN**, *Honorary Professor, Supercomputer Education and Research Centre, Indian Institute of Science, Bangalore.*

One of the most important uses of computers is (as an aid to managers) to provide up-to-date information to efficiently run their organizations. Of the total number of computers installed in the world today, over eighty percent are used in organizations for management information systems. It is thus very important for all students of management, commerce and computer science to know how to design computer-based information systems to aid management. This introductory text gives a lucid, self-contained presentation to students on how to analyse and design information systems for use by managers.

Information Systems Analysis and Design (also known as System Analysis and Design) is a compulsory subject for MCA, BCA, B.Com. and B.E. students of Computer Science and Information Technology. This book covers the syllabus of this course and that of the DOEACC (Level A) examination.

Thoroughly classroom tested and evolved out of twenty years of teaching Information Systems Design course at IIT Kanpur and IISc., Bangalore, this book presents real Indian examples.

In this third edition every chapter has been updated, besides the addition of a new chapter on **Use Case Method** to reflect the rapid changes taking place in designing information systems.

This book has been used to prepare learning material for the course Systems Analysis and Design for the National Programme for Technology Enhanced Learning of the Ministry of Human Resource Development, Government of India. The author has also delivered 40 lectures on this topic which may be heard in YouTube. This book also contains supplementary materials like PPTs and objective questions with explanation for each incorrect choice which are available on [www.phindia.com/rajaraman\\_ADIS](http://www.phindia.com/rajaraman_ADIS)

**CONTENTS:** Preface. Information and Management. Examples of Information Systems. Information Systems Analysis Overview. Information Gathering. System Requirements Specifications. Feasibility Analysis. Data Flow Diagrams. Process Specifications. Decision Tables. Use Case Method. Logical Database Design. Database Management Systems (DBMS). Object-Oriented System Modelling. Data Input Methods. Designing Outputs. Control, Audit and Security of Information Systems. Electronic Commerce. System Design Example. Appendix. References. Index.

Latest Print 2014 / 344 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4384-9 / 295.00

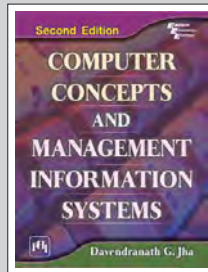




## COMPUTER SCIENCE AND ENGINEERING

### Management Information System

#### Computer Concepts and Management Information Systems, 2nd ed.



**DAVENDRANATH G. JHA**, *Senior Faculty of Information System, K.J. Somaiya Institute of Management Studies and Research, Mumbai.*

The book, in its second edition, precisely addresses the need of management students to acquaint with the basic concepts of computers, information technology and information system.

The book provides readers with information pertaining to database concepts, networking essentials, web concepts and phases of system development life cycle. The business processes such as Enterprise Resource Planning, Customer Relationship Management and in e-Commerce are also introduced in the second edition.

Thus the book can be regarded as one-stop compact teaching-reading resource for getting started with topics relevant to development of IT solutions.

#### KEY FEATURES

- The text is lecture based, which makes the teaching of the subject easier.
- Comprehensive coverage of all important topics for thorough understanding of the subject.
- Chapter-end review questions help students test their own knowledge of the subject matter.
- Chapter-end summary for quick recapitulation of concepts before examination or moving to the next chapter.
- Tables, figures and illustrations enhance concept apprehension.

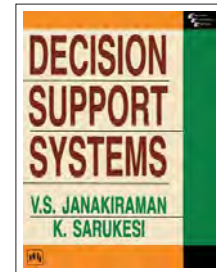
**CONTENTS:** Preface. Elements of Computer System. History and Classification of Computers. Hardware and Peripheral Devices. Classifying Software. Operating System and File Organization Design. Database Concepts. Network Essentials. Web Concepts. System Development Process. Information System. IT Applications in Business. Glossary. Bibliography. Model Paper. Index.

**Latest Print 2013 / 232 pp. / 16.0 × 24.1 cm**

**ISBN-978-81-203-4707-6 / ₹ 195.00**



#### Decision Support Systems



**V.S. JANAKIRAMAN**, *Professor of Computer Science, PSG College of Arts & Science, Coimbatore.*

**K. SARUKESI**, *Professor of Computer Science, Bharathiyar University, Coimbatore.*

This compact and easy to read book describes in detail the basic principles of Decision Support Systems (DSS). The book also gives a comprehensive account of the various models used in decision making process, the many facets of DSS and explains how they are implemented. Further, it discusses the significance of business reengineering, the role of client-server technology, Internet and Intranet, and analyzes the concepts of Database Management Systems (DBMS), model management and various GUIs.

Designed as a textbook for the undergraduate and graduate students of computer science and management, this book would also be of great help to the practising professional.

**CONTENTS:** Preface. Acknowledgements. Concepts in General Management. Information Systems. Decision Support Systems. Database Management Systems. Model Base Management Systems. Dialogue Management Subsystem. Hardware and Software Technologies for DSS. Artificial Intelligence and Expert Systems. Internet: The Future of Computing. Electronic Data Interchange. Computer Networks. Appendix A—Oracle: A Case Study in Oracle. B—Interactive Financial Planning System. Index.

**Latest Print 2009 / 236 pp. / 16.0 × 24.1 cm**

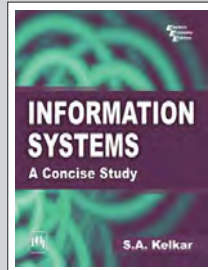
**ISBN-978-81-203-1444-3 / ₹ 150.00**

## COMPUTER SCIENCE AND ENGINEERING

### Management Information System

#### Information Systems: A Concise Study

**S.A. KELKAR**, *Former Adjunct Professor, Department of Computer Science and Engineering as well as at the Shailesh J. Mehta School of Management, IIT Bombay.*



This comprehensive book serves as a “one-stop overview” for understanding, developing, and deploying Information Systems. It aims to provide the students with a conceptual framework to understand Information Systems (IS). The text, written in easy to understand language using bullet form style to highlight various points, covers topics the way they are encountered by a typical IS professional.

The book is divided into three units—Unit I: Information Systems Basics; Unit II: Managing with Information; and Unit III: Managing Information Resources. Some of the topics discussed enlarge the scope of the book and include: e-Commerce and e-Business; CRM, ERP, SCM; Application Scrap Book; Enterprise and Strategy; Strategy Planning for IS; and Justification for IS. The main body of the text is supplemented with six appendices, which can be read on a need-to-know basis.

The book is well suited for the undergraduate students of Computer Science and Engineering, Information Technology; postgraduate students of Information Technology and Computer Science; and students pursuing MCA and MBA. Those teaching a course on IS or conducting equivalent training programme for professionals will also benefit from this text. Finally, the book would be useful for those professionals who wish to grasp the essentials without attending a formal instructional course.

**CONTENTS:** Preface. Abbreviations. Unit One: Information Systems Basics—Managing in the 21st Century. Information, Systems, and IS. Classification of IS. Applications Scrap Book. e-Commerce and e-Business. CRM, ERP, and SCM. Unit Two: Managing with Information—Enterprise and Strategy. Strategic Planning. IS for Decision Support. Justification for IT/IS. Unit Three: Managing Information resources—Information Resources Management. Strategic Planning for IS Function. Information Security and Integrity. Appendices—A. Information Technology Basics. B. Data Management. C. Software Development in Nutshell. D. Brief Look at Software Project Management. E. Software Requirements Elicitation. F. Note on Metrics and Measurements. Suggested Reading.

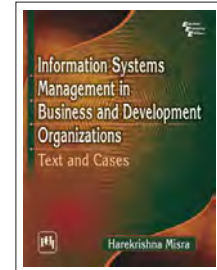
Latest Print 2009 / 952 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3651-3 / 495.00



PHI Learning: Publications

#### Information Systems Management in Business and Development Organizations: Text and Cases



**HAREKRISHNA MISRA**, *Professor, IT and Information Systems Group, Institute of Rural Management Anand (IRMA), Gujarat.*

Management Information Systems (MIS) has fast emerged as a multi-disciplinary area having strategic interfaces to achieve organizational objectives. This comprehensive book discusses the underlying principles of business and development organizations, identifies their core areas and prescribes approaches to develop MIS.

Divided into five parts, **Part I—Understanding Organizations for MIS** deals with organizational issues and focuses on the rationale behind creating organizations, especially business and development organizations, to understand their distinguishing features. **Part II—Systems Approach to Organizations** covers conceptualization, identification, design and development of Information System (IS) for the organization in order to have better systems in place to support organizational goals. **Part III—Understanding MIS** discusses the relevance of MIS in organizations and the forms it can take to meet the strategic needs of the respective organizations. **Part IV—Understanding Information Technologies** describes possible approaches to plan, identify and deploy ICT in the acquiring organizations and provides insight into the barriers that creep in during identification and deployment of IS and ICT keeping in view the organizational objectives. **Part V—Planning and Implementation of MIS** concludes with a discussion on preparation of MIS plan and issues related to its implementation.

The book is intended for the postgraduate students of management specializing in rural management and IT.

**CONTENTS:** Preface. Introduction An Overview of MIS. Part I: Understanding Organizations for MIS—Understanding Business Organizations. Understanding Development Organizations. Organizational Management and Control: Commonality in Business and Development Organizations. Part II: Systems Approach to Organizations—Systems Approach to Organizations. Managing Data and Information. Information System Evolution and Modelling. Information System (Identification, Design and Development). Information System Quality. Part III—Understanding MIS—MIS—Its Organization. Forms of MIS. Architecture of MIS. Part IV—Understanding Information Technologies—Understanding and Planning Information Technologies (Hardware, Software and Databases). Understanding and Planning Information Technologies (Network and Communication). Planning Information Technologies Infrastructure. Part V—Planning and Implementation of MIS—Planning MIS. Implementation of MIS. Index.

Latest Print 2013 / 400 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4796-0 / 350.00



## COMPUTER SCIENCE AND ENGINEERING

### Management Information System

#### Magnifying Object-Oriented Analysis and Design



**ARPITA GOPAL** is Director–MCA at Sinhgad Institute of Business Administration and Research, Pune.  
**NETRA PATIL** is Assistant Professor, Sinhgad Institute of Business Administration and Research, Pune.

A firm grounding in the theory of object-oriented analysis and design and its practical application is essential for understanding how to build good software. This book, the third of the *Magnifying Series*, attempts to explain the object-oriented analysis and design of software through case studies covering various business domains.

The book describes various software development models and techniques before introducing the concepts and principles of object-oriented analysis and design. It explains analysis models with the help of business process diagrams, use-case diagrams, class diagrams and object diagrams. The book elaborates design models through sequence diagrams, collaboration diagrams, statechart diagrams and activity diagrams. It also deals with implementation models with the help of component and deployment diagrams. For each diagram, its purpose, notations and design guidelines are given. In addition, the book explains existing object-oriented methodologies.

#### KEY FEATURES

- Develops a framework for analysis of business cases followed by design of software solutions for them.
- Includes several case studies to depict the application of object-oriented analysis and design.
- Presents chapter-end exercises for the students' comprehension of the subject matter.

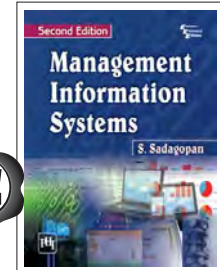
The text is designed for the students of computer applications (BCA/MCA), computer science (B.Sc./M.Sc.), and computer science and engineering (BE/B.Tech).

**CONTENTS:** Preface. System Analysis and Design. Object-Oriented Analysis and Design. Business Process Diagram and Use Case Diagram. Class Diagram and Object Diagram. Sequence Diagram and Collaboration Diagram. Activity Diagram and State Chart Diagram. Component Diagram and Deployment Diagram. CASE STUDIES: Student Loan System. On Line Trading of Securities. Credit Card Management System. Warehouse Management System. Existing Object-Oriented Methodologies. Index.



Latest Print 2014 / 304 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4068-8 / ₹ 250.00

#### Management Information Systems, 2nd ed.



**S. SADAGOPAN** is the Director of IIIT-Bangalore since 1999. Earlier he had taught at IIT-Kanpur (1979–1995) and IIM-Bangalore (1995–1999); he had also taught at RUTGERS (The State University of New Jersey, USA) in 1997 and at AIT-Bangkok in 1990.

It is widely recognised that the knowledge of information systems is essential in today's business organisations to survive and prosper. This book in its Second Edition, discusses all the major areas in information systems. It includes issues in the design, development and application of organisation-wide information systems and their effect on business and organisations. The issues discussed in the book supports the management of an enterprise in its planning, operation and control functions.

#### SALIENT FEATURES OF THE BOOK

- Balanced treatment of both the technical and organisational issues involved
- Wide range of topics including databases, decision support systems, expert systems and system analysis
- Contemporary examples from the Indian industry

Though the main structure of the Second Edition remains the same, the chapters have been updated and revised as per the recent developments in the field of information technology.

#### NEW TO THIS EDITION

- Several 'Case-studies' have been incorporated at the end of each chapter.
- New references have been included in the text to support the added text.
- Learning objectives have been given at the beginning of each chapter.
- The text is presented in an attractive manner as numerous new figures and pictures have been added.

**CONTENTS:** Preface. Note to Instructor. Introduction. Organisational Systems. Information Systems and Organisations. Computers and Information Systems. Communication Technology. Database Technology. Decision Support Systems (DSS). Expert Systems and Artificial Intelligence. System Analysis and Design. Bibliography. Index.

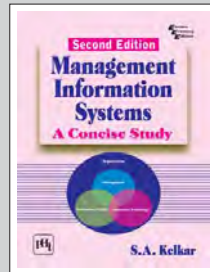
Latest Print 2014 / 336 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4892-9 / ₹ 325.00



## COMPUTER SCIENCE AND ENGINEERING

### Management Information System

#### Management Information Systems: A Concise Study, 2nd ed.



**S.A. KELKAR**, Former Adjunct Professor, Department of Computer Science and Engineering as well as at the Shailesh J. Mehta School of Management, IIT Bombay.

It is widely recognized that the knowledge of information systems is very much essential in today's business organizations to survive and prosper. This book, in its second edition, provides students with a conceptual framework to understand information systems. The focus of information systems (irrespective of the level of use of information) is on producing quality information needed to facilitate decision making. The objective of this book is to capture the material on information systems and organize it around a framework that offers a current and relevant knowledge based on information system by providing just the adequate amount of material in a concise format.

The book is organized in three parts: (i) **Information systems basics**, (ii) **Managing with information** and (iii) **Managing information resources**. Though the main structure of the second edition remains the same, the chapters have been updated and revised as per the recent development in the fields of information technology. Besides this, a new chapter is added to explain the concepts like e-business, Customer relationship management (CRM), Enterprise resources and planning (ERP) and Supply chain management (SCM), comprehensively.

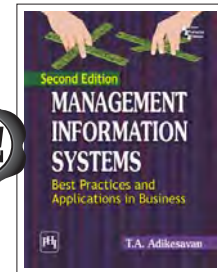
Intended for the students of computer applications (BCA and MCA) and management (BBA and MBA), and the undergraduate students of Computer Science engineering, the book is equally useful for the busy professionals who wish to grasp the essentials of management information systems, without attending a formal instructional course.

**CONTENTS:** Preface. Preface to the First Edition. Abbreviations. Unit One: Information Systems Basics—Managing in 21st Century. Information, Systems, and IS. Classification of IS. E-business, CRM, ERP, and SCM. Unit Two: Managing With Information—Strategic Planning and IS. Justification for IT/IS. IS for Decision Support. Quality and Privacy Issues. Unit Three: Managing Information Resources—Information Resources Management. Strategic Planning for IS Function. Security, Control and Audit. Suggested Reading.

 Latest Print 2012 / 316 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3765-7 / 250.00

PHI Learning: Publications

#### Management Information Systems Best Practices and Applications in Business, 2nd ed.



**T.A. ADIKESAVAN**, Management Consultant and a Visiting Faculty, University of Madras, Chennai.


This substantially enriched second edition of the book includes evolution of IT applications in business over last five decades, to enable readers in understanding how IT offers newer solutions to modern business. It also discusses the knowledge management systems, various e-business models including e-marketing, Internet architecture and business technology management (BTM), where the focus is on strategic exploitation of IT.

The unique arrangement of the contents in the book exposes the readers from the basics of IT to all potential IT applications viz., data and transaction processing, MIS and EIS, business integration, CRM, business intelligence, decisions support systems, data warehouse and data mining. How technology benefits business, is the core of this book.

The book also explains generic contributions of IT to business, enormity of business processes and management functions, what the business expects from the technology, systems audit and controls and software engineering and various techniques which lead to reliable, accurate, and secured deployment of IT applications in business. The text is highly practice oriented and is illustrated with a number of real-life examples and case studies.

The book is designed for the postgraduate students pursuing business management and computer applications.

**CONTENTS:** Preface. Acronyms/Abbreviations. Information Technology (IT): Leveraging Modern Business and Management. Decision Making in Business (Data, Information, Knowledge and Wisdom). Constituents of IT Applications in Business. Information Technology: Tactical Applications in Business. Business Technology: Strategic IT Applications in Business. Information Technology Applications in Management Functions. Practical Approach for Managers in Identifying Right IT Applications. Design and Implementation of Integrated Business Application Software Package (IBASP) for Business: Software Development Life Cycle Activities—SDLC (Waterfall Method). IT Applications' Integrity, Audit and Control and Attributes of Ideal IT Applications in Business. Security of IT Resources Including Business Data and Information. Computers: Structure, Networks and Architectures. Computer Software, Case Tools and Good Programming Practices. Data and Database Management Systems. System Theory and Information Systems. Information Technology Services Division (ITSD): Functions and Responsibilities. IT Applications in Select Service Industries (Banks, Hospitals and Hotels) and E-governance. Information Technology: Genuine Concerns for Humanity. Business Technology Management. Index.

 Latest Print 2014 / 424 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4896-7 / 395.00



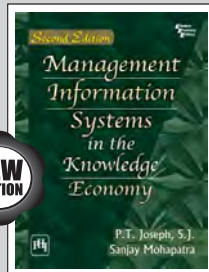
## COMPUTER SCIENCE AND ENGINEERING

### Management Information System

#### Management Information Systems in the Knowledge Economy, 2nd ed.

**P.T. JOSEPH, S.J.**, Professor of Information Systems and Organizational Behaviour at the Xavier Institute of Management Bhubaneswar (XIMB). Currently, he also holds the position of the Director of XIM Bhubaneswar.

**SANJAY MOHAPATRA**, Professor of Information Systems at the Xavier Institute of Management Bhubaneswar (XIMB).



The textbook, now in its Second Edition, includes a new chapter on *ERP as a Business Enabler*. The text continues to provide a comprehensive coverage of business applications of management information systems in today's new era of knowledge-based economy where the value of a firm's knowledge assets has become a key source that can be leveraged into long-term benefits. The text focuses on the information systems requirements vis-à-vis management perspectives required in business environment. The technology innovations are covered, with particular emphasis on Data Management Systems, Decision Support and Expert Systems. On the other hand, several business applications such as e-commerce and mobile applications, made possible only because of continuing innovations in the field of information and communications technology (ICT) are thoroughly treated in the text. Besides, the book covers crucial issues of information security, and legal and ethical issues which are important both from the point of view of technology and business.

The book uses case discussions in each chapter to help students understand MIS practices in organizations. The cases also enable students to grasp how a systemic approach to every functional aspect of management can lead to formulating technology-based strategies in line with corporate goals.

Primarily intended for undergraduate and postgraduate students of management (BBA/MBA), the knowledge and information provided in this book will also be of immense value to business managers and practitioners for improving decision-making processes and achieving competitive advantage.

**CONTENTS:** Preface. Preface to the First Edition. Information Systems in the Knowledge Economy. Information Systems for Strategic Advantage. Database Design and Process Modelling. Decision Support and Expert Systems. Knowledge Management for Strategic Advantage. Computer Communication Systems. Information Systems Supporting e-Commerce Models. Information Systems for Mobile Commerce. Knowledge Management Applications in Business Functions. Information System Security. Legal and Ethical Issues. ERP as a Business Enabler. Index.



Latest Print 2014 / 560 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4876-9 / ₹ 475.00

### Microprocessors and Microcontrollers

#### 8000 to 8085: Introduction to Microprocessors for Engineers and Scientists, 2nd ed.



**P.K. GHOSH**, former Professor at the Indian Institute of Technology Kanpur.

**P.R. SRIDHAR**, Electronics Engineer, Indian Institute of Technology Kanpur.

The 8085 processor and its peripherals have been used to explain the basic concepts of microprocessor operation and system realization. This text can be used by electrical engineering undergraduates in their first course on microprocessors, and by engineering students in several other disciplines, and also by students of science with some preparation in digital electronics.

#### KEY FEATURES

- The peripheral devices are discussed comprehensively.
- The text gives design principles along with complete circuit and printed circuit board details of a stand-alone microcomputer. This also serves as an outstanding illustration of practical realization of microprocessor-based systems.
- The text has been successfully tested in the classroom and also in workshops on microprocessor systems.
- In the present edition, a sample set of monitor routines has been given, the number of problems has been substantially increased, and *full solutions* to the extended problem set have been provided.

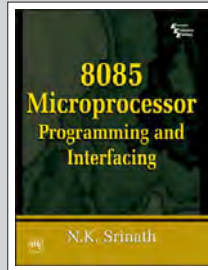
**CONTENTS:** Preface. Preface to the First Edition. The Generic Microcomputer. The Architecture of a Microprocessor. The 8085A CPU. The 8085A Instruction Set. Memory and Input/Output Addressing. 8085A Minimum System Configuration. EPROM and RAM Memories: 2764 and 6264. Programmable Keyboard/Display Interface: 8279. Programmable Interval Timer: 8253. Programmable Peripheral Interface: 8255. Serial Communication and the USART 8251. Programmable DMA Controller: 8257. Programmable Interrupt Controller: 8259. Appendices: A—A Summary of Basic Digital Circuits. B—Some Assembly Language Programs. C—Design Principles and Full Circuit Description of the Microcomputer CASE 3.1. D—8085A Instruction Set Tables. Problems. Solutions to the Problems. Index.

Latest Print 2013 / 328 pp. / 21.6 × 27.8 cm  
ISBN-978-81-203-0978-4 / ₹ 350.00

## COMPUTER SCIENCE AND ENGINEERING

### Microprocessors and Microcontrollers

#### 8085 Microprocessor: Programming and Interfacing



**N.K. SRINATH**, *Professor and Head, Department of Information Science and Engineering, R.V. College of Engineering, Bangalore.*

This up-to-date and contemporary book is designed as a first level undergraduate text on microprocessors for the students of engineering (computer science, electrical, electronics, telecommunication, instrumentation), computer applications and information technology. It gives a clear exposition of the architecture, programming and interfacing and applications of 8085 microprocessor. Besides, it provides a brief introduction to 8086 and 8088 Intel microprocessors.

#### THE BOOK FOCUSSES ON:

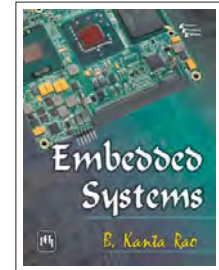
- microprocessors starting from 4004 to 80586.
- instruction set of 8085 microprocessor giving the clear picture of the operations at the machine level.
- the various steps of the assembly language program development cycle.
- the hardware architecture of microcomputer built with the 8085 microprocessor.
- the role of the hardware interfaces: memory, input/output and interrupt, in relation to overall micro-computer system operation.
- peripheral chips such as 8255, 8253, 8259, 8257 and 8279 to interface with 8085 microprocessor and to program it for different applications.

**CONTENTS:** Foreword. Preface. Acknowledgements. Introduction to Microprocessors. 8085 Microprocessor. Instruction Set [Intel 8085]. Fundamentals of Programming. Semiconductor Memory. Input/Output Interface. Programmable Peripheral Interface 8255A. Programmable Internal Timer 8253. Programmable Interrupt Controller 8259A. Programmable DMA Controller 8257. Serial Data Transfer. Programmable Keyboard/Display Interface (8279). 8086 Microprocessor Architecture. 8086 Pin-Configuration. Appendix. Index.



Latest Print 2014 / 348 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2785-6 / ` 295.00

#### Embedded Systems



**B. KANTA RAO**, *Senior Professor, Department of Computer Science and Engineering, Gayatri College of Engineering, Visakhapatnam.*

Designed as a textbook for the undergraduate students of electronics and communication engineering, electronics and instrumentation engineering, computer science and engineering, information communication technology as well as for the postgraduate students of computer applications (MCA), it lays the foundation for all readers on all possible applications of embedded processors.

This text deals with some of the interesting processors that will enlighten the need for new instructions and fast program implementation. The processors covered are the classic 8051 family, ATmega family, PIC family and Texas 430 family along with a good introduction to ARM processors.

#### KEY FEATURES

- Well designed hardware–software integrated programs and exercises
- Examples for each processor instruction set
- Extensive discussion on classic 8051 family including all recent developments

**CONTENTS:** Preface. Embedded Processor Architectures: An Overview. Intel 8051 Architecture (Classic Version). Programming. Communication Interfaces. Timers and Counters. Analog Subsystems in Embedded Processors. Advanced Research Microprocessor (ARM) Architecture. Advanced Embedded Systems: ATmega Processors. Microchip PIC Embedded Processor Family. Integrated Development Environment: Assembler and Simulation. Introduction to Real Time Systems. Appendices. Index.

Latest Print 2014 / 560 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4081-7 / ` 425.00



## COMPUTER SCIENCE AND ENGINEERING

### Microprocessors and Microcontrollers

#### Embedded System Design, 2nd ed.

**SANTANU CHATTOPADHYAY,**  
*Professor at the Department of  
Electronics and Electrical  
Communication Engineering, Indian  
Institute of Technology Kharagpur.*



Embedded system, as a subject, is an amalgamation of different domains, such as digital design, architecture, operating systems, interfaces, and algorithmic optimization techniques. This book acquaints the students with the alternatives and intricacies of embedded system design. It is designed as a textbook for the undergraduate students of Electronics and Communication Engineering, Electronics and Instrumentation Engineering, Computer Science and Engineering, Information Communication Technology (ICT), as well as for the postgraduate students of Computer Applications (MCA).

While in the hardware platform the book explains the role of microcontrollers and introduces one of the most widely used embedded processor, ARM, it also deliberates on other alternatives, such as digital signal processors, field programmable devices, and integrated circuits. It provides a very good overview of the interfacing standards covering RS232C, RS422, RS485, USB, IrDA, Bluetooth, and CAN.

In the software domain, the book introduces the features of real-time operating systems for use in embedded applications. Various scheduling algorithms have been discussed with their merits and demerits. The existing real-time operating systems have been surveyed. Guided by cost and performance requirements, embedded applications are often implemented partly in hardware and partly in software. The book covers the different optimization techniques proposed in the literature to take a judicious decision about this partitioning of application tasks. Power-aware design of embedded systems has also been dealt with.

In its second edition, the text has been extensively revised and updated. Almost all the chapters have been modified and elaborated including detailed discussion on hardware platforms—ARM, DSP, and FPGA. The chapter on “interfacing standards” has been updated to incorporate the latest information.

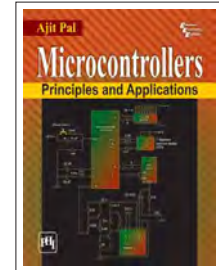
The new edition will be thereby immensely useful to the students, practitioners and advanced readers.

**CONTENTS:** Preface. Introduction. ARM: An Advanced Microcontroller. Digital Signal Processors. Field Programmable Gate Arrays. Interfacing. Real-time Operating System. Specification Techniques. Hardware–Software Cosimulation. Hardware–Software Partitioning. Functional Partitioning and Optimization. Low Power Embedded System Design. Bibliography. Index.



Latest Print 2013 / 240 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4730-4 / ₹ 225.00

#### Microcontrollers: Principles and Applications



**AJIT PAL,** *Professor in the Department of Computer Science and  
Engineering at Indian Institute of Technology Kharagpur.*

This book gives a comprehensive coverage of different aspects of microcontroller-based system design and development in a generalized manner. Basic ideas and fundamental concepts common to all microcontrollers have been introduced before giving specific examples using the 8051 microcontroller, which is the most popular microcontroller in use today. Coverage of the three important issues such as hardware, software and hardware-software integration has been provided in a balanced manner. For easy understanding of the subject, a bottom-up approach has been followed.

The book is designed for the undergraduate students of electrical engineering, computer science and engineering, and electronics and communication engineering.

#### KEY FEATURES

- Provides many pedagogical features such as learning objectives, introduction, examples, summary, fill in the blanks and chapter-end exercises to assist teaching and learning.
- Pays special attention to the interfacing of I/O devices for human interaction, and I/O devices for process control and instrumentation, which are important in the context of embedded systems.
- Gives comprehensive information about development aids and trouble-shooting techniques for the development of microcontroller-based systems.
- Includes a number of real-life application examples, with complete details of hardware and software implementation, after fabricating prototype models in the laboratory.

**CONTENTS:** Preface. Introduction. Architecture of the Intel 8051. Instruction Set: Vocabulary of the Machine. Assembly Language Programming. Interfacing External Memory. Data Transfer Techniques and I/O Ports. Interfacing for Human Interaction. Interfacing of Transducers, Sensors and Actuators. Timer/Counter Operations. Serial Mode of Data Transfer. System Development and Development Aids. Application Examples. Index.

Latest Print 2014 / 392 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4392-4 / ₹ 350.00

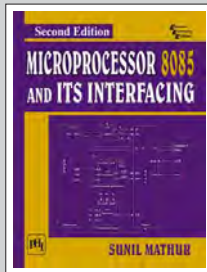


## COMPUTER SCIENCE AND ENGINEERING

### Microprocessors and Microcontrollers

#### Microprocessor 8085 and its Interfacing, 2nd ed.

**SUNIL MATHUR**, Assistant Professor, Department of Electronics and Communication Engineering, Maharaja Agrasen Institute of Technology, Guru Gobind Singh Indraprastha University, Delhi.



This comprehensive and thoroughly updated text now in its second edition continues to provide the complete knowledge about the Intel's 8085 microprocessors, its programming and concept of interfacing of memory, Input/output devices and programmable peripheral chips.

Organized in four parts, Part I (Chapters 1–9) covers a review of the analog and digital signals as well as hardware and software related aspects of microprocessor 8085. Part II (Chapters 10 and 11) discusses memory and input-output concepts, analog to digital and digital to analog converters and various memory and IO address decoding techniques. Part III (Chapters 12–17) explains the programmable interfacing chips with extensive interfacing examples. Part IV (Chapters 18 and 19) presents a brief discussion on other 8-bit microprocessors along with 16 and 32-bit Intel Processors. Each topic has been supported with numerous examples that will help students apply the concepts to other microprocessors in the course at advanced level.

This book is designed specifically for the undergraduate students of electronics and communication engineering, computer science and engineering, and information technology.

#### NEW TO THIS EDITION

- Chapters on “Architecture and Organization of Microprocessor” and “Instruction Set of 8085 Microprocessor” have been revised and modified substantially.
- Multiple choice questions have been added to all the chapters.

**CONTENTS:** Preface. Preface to the First Edition. Acknowledgements. PART—I: Number System. Architecture and Organization of Microcomputer. Architecture and Organization of Microprocessor. Instruction Set of 8085 Microprocessor. Instruction Timing and Operation of 8085 Microprocessor. Programming of 8085 Microprocessor. Stack and Subroutine. Interrupts of 8085. Serial and Parallel Data Transfer. PART—II: IO and Memory Interfacing. Digital–Analog Conversion. PART—III: Non-Programmable and Programmable Peripheral Interfacing Chips. 8253/54 Programmable Timer. DMA Controller 8257 and 8237. 8259A, Programmable Interrupt Controller (PIC). Keyboard and Display Interfacing. 8251 Universal Synchronous Asynchronous Receiver Transmitter (USART). PART—IV: Other 8-Bit Microprocessors. Advance Microprocessors. Index.

Latest Print 2013 / 704 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4390-0 / 450.00



PHI Learning: Publications

#### Microprocessor 8085: Architecture, Programming, and Interfacing



**AJAY WADHWA**, Associate Professor, Department of Physics, SGTB Khalsa College, University of Delhi.

This book is designed as a first-level introduction to Microprocessor 8085, covering its architecture, programming, and interfacing aspects. Microprocessor 8085 is the basic processor from which machine language programming can be learnt. The text offers a comprehensive treatment of microprocessor's hardware and software.

#### DISTINGUISHING FEATURES

- All the instructions of 8085 processor are explained with the help of examples and diagrams.
- Instructions have been classified into groups and their mnemonic hex codes have been derived.
- Memory maps of different memory sizes have been illustrated with examples.
- Timing diagrams of various instructions have been illustrated with examples.
- A large number of laboratory-tested programming examples and exercises are provided in each chapter.
- At the end of each chapter, numerous questions and problems have been given.
- Problems from previous years' question papers have been separately given in each chapter.
- More than 200 examples and problems have been covered in the entire text.

This book is designed for undergraduate courses in B.Sc. (Hons) Physics and B.Sc. (Hons) Electronics. It will also be useful for the students pursuing B.Tech. degree/diploma in electrical and electronics engineering.

**CONTENTS:** Preface. Basic Computer Design. Microprocessor 8085 Architecture. Assembly Language Programming. Memory. Microprocessor—Timing and Control. Interfacing. Appendices. Index.

Latest Print 2013 / 172 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-4013-8 / 150.00

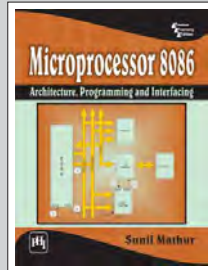




## COMPUTER SCIENCE AND ENGINEERING

### Microprocessors and Microcontrollers

#### Microprocessor 8086: Architecture, Programming and Interfacing



**SUNIL MATHUR** is Assistant Professor, Department of Electronics and Communication Engineering, Maharaja Agrasen Institute of Technology, Guru Gobind Singh Indraprastha University, Delhi.

Primarily intended for the undergraduate students of electronics and communication engineering, computer science and engineering, and information technology, this book skilfully integrates both the hardware and software aspects of the 8086 microprocessor. It offers the students an up-to-date account of the state-of-the-art microprocessors and therefore can be regarded as an incomparable source of information on recently developed microprocessor chips. The book covers the advanced microprocessor architecture of the Intel microprocessor family, from 8086 to Pentium 4.

The text is organized in four parts. Part I (Chapters 1–7) includes a detailed description of the architecture, organization, instruction set, and assembler directives of microprocessor 8086. Part II (Chapters 8–11) discusses the math coprocessor, multiprocessing and multiprogramming, the different types of data transfer schemes, and memory concepts. Part III (Chapters 12–15) covers programmable interfacing chips with the help of extensive interfacing examples. Part IV (Chapters 16–18) deals with advanced processors—from 80186 to Pentium 4.

This well-organized and student-friendly text should prove to be an invaluable asset to the students as well as the practising engineers.

#### KEY FEATURES

- Gives elaborate programming examples to develop the analytical ability of students.
- Provides solved examples covering different types of typical interfacing problems to develop the practical skills of students.
- Furnishes chapter-end exercises to reinforce the understanding of the subject.

**CONTENTS:** Preface. Acknowledgements. Architecture and Organization of Microprocessors and Microcomputers. Introduction to 8086. 8086 Based System. Instructions Set of 8086. Assembler Directives. Programming of 8086. Interrupts of 8086. Math Coprocessor 8087. Multiprocessing and Multiprogramming. Serial and Parallel Data Transfer. IO and Memory Interfacing. Programmable Peripheral Interfacing Chips. 8253/54 Programmable Timer. DMA Controller 8257 and 8237. Keyboard and Display Interfacing. 80186 and 80286 Microprocessors. Intel's 32-bit Microprocessors. Today's Processor's. Index.



Latest Print 2012 / 688 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4087-9 / ₹ 450.00

#### Microprocessors and Microcontrollers: Architecture, Programming and System Design 8085, 8086, 8051, 8096, 2nd ed.



**KRISHNA KANT**, Dean (Academic) at Jaypee Institute of Information Technology, Noida.

This book provides the students with a solid foundation in the technology of microprocessors and microcontrollers, their principles and applications. It comprehensively presents the material necessary for understanding the internal architecture as well as system design aspects of Intel's legendary 8085 and 8086 microprocessors and Intel's 8051 and 8096 microcontrollers.

The book throughout maintains an appropriate balance between the basic concepts and the skill sets needed for system design. Besides, the book lucidly explains the hardware architecture, the instruction set and programming, support chips, peripheral interfacing, and cites several relevant examples to help the readers develop a complete understanding of industrial application projects. Several system design case studies are included to reinforce the concepts discussed.

With exhaustive coverage and practical approach, the book would be indispensable to undergraduate students of Electrical and Electronics, Electronics and Communication, and Electronics and Instrumentation Engineering. It can be used for a variety of courses in Microprocessors, Microcontrollers, and Embedded System Design.

The second edition of the book introduces additional topics like I/O interfacing and programming, serial interface programming, delay programming using 8086 and 8051. Besides, many more examples and case studies have been added.

**CONTENTS:** Preface. Preface to the First Edition. Acknowledgements. System Design Using Microprocessor. What a Microprocessor Is. Intel 8085 Microprocessor—Hardware Architecture. Intel 8085 Microprocessor—Instruction Set and Programming. Intel 8086—Hardware Architecture. Intel 8086 Microprocessor—Instruction Set and Programming. Microprocessor—Peripheral Interfacing. System Design Using Intel 8085 and Intel 8086 Microprocessors—Case Studies. Intel 8051 Microcontroller—Hardware Architecture. Intel 8051 Microcontroller—Instruction Set and Programming. The 8051 Microcontroller-Based System Design—Case Studies. Intel 8096 Microcontroller—Hardware Architecture. Intel 8096 Microcontroller—Instruction Set and Programming. The 8096 Microcontroller-Based System Design—Case Studies. Appendices. Index.

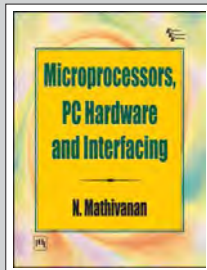
Latest Print 2014 / 876 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4853-0 / ₹ 495.00



## COMPUTER SCIENCE AND ENGINEERING

### Microprocessors and Microcontrollers

#### Microprocessors, PC Hardware and Interfacing



**N. MATHIVANAN**, *Director, University Science Instrumentation Centre, Madurai Kamraj University, Madurai.*

Microprocessor is the most fundamental components in PC systems, and for learning the hardware organization and interfacing techniques, a complete knowledge of 8086 microprocessor is essential. This book thus provides a complete picture of the features and workings of microprocessor. It explains the architecture, instructions, programming, system design, peripheral devices and interfacing.

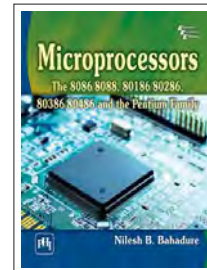
Beginning with an overview of PC hardware from the original IBM PC to the recent Pentium systems, the book presents the internal architecture and instruction set of 8086 microprocessor and the design of an 8086 based system, and then describes the hardware and software of interfacing techniques to I/O buses and the standard ports in detail, substantiating them with examples and worked out programs in C++ and assembly language. Operations of advanced Intel microprocessors such as 80286, 80386, 80486, Pentium, Pentium Pro, Pentium MMX and Pentium II, and usage of the pins and signals of different types of I/O buses have also been covered in detail.

The book is useful for students of electronics and instrumentation engineering, and courses in communication.

**CONTENTS:** Preface. Hardware Organization of IBM PC. The 8086 Microprocessor. The 8086 Based System Design. Peripheral Interfaces. Advanced Microprocessors. The Motherboard of IBM PC. Drives. Peripherals. Input-Output Buses. Parallel and Serial Ports. Universal Serial Bus. Appendices. Objective-Type Questions. Answers to Select Review Questions. Index.

**Latest Print 2012 / 532 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-2317-9 / ₹ 350.00**

#### Microprocessors: The 8086/8088, 80186/ 80286, 80386/80486 and the Pentium Family



**NILESH B. BAHADURE**, *Reader in the Department of Electronics and Telecommunication Engineering at the Bhilai Institute of Technology, Durg.*

This comprehensive text provides a thorough understanding of the principles and applications of microprocessors. It explains the architectures, assembly language programming, interfacing, and applications of Intel's 8086/8088 microprocessors, 8087 math coprocessor, and 8255, 8253, 8251, 8259, 8279 and 8237 peripherals. Besides, the book also covers Intel's 80186/80286, 80386/80486, and the Pentium family microprocessors.

The book throughout maintains an appropriate balance between the basic concepts and the skill sets needed for system design. A large number of solved examples on assembly language programming and interfacing are provided to help the students gain mastery of the topics discussed.

The book is eminently suitable for undergraduate engineering students of Electronics, Electronics and Communication, Electronics and Instrumentation, Computer Science and Engineering, and Information Technology.

**CONTENTS:** Preface. Introduction. Architecture and Functional Block Diagram of Microprocessor 8086. Instruction Sets and Programming of Microprocessor 8086. Assembly Language Programming of Microprocessor 8086. Interrupts of Microprocessor 8086. Interfacing of Memory with Microprocessors 8086 and 8088. Timing Diagram of Microprocessor 8086. Numeric Data Processor 8087. Programmable Peripheral Interface 8255. Programmable Interval Timer 8253/8254. Programmable Interrupt Controller. Universal Synchronous—Asynchronous Receiver Transmitters. Programmable Keyboard Display Interface 8279. Direct Memory Access (DMA) Controller 8257/8237. Other 16 Bits Microprocessors 80186 and 80286. 32 Bits Microprocessors 80386, 80486 and Introduction to Pentium Family. Index.

**Latest Print 2014 / 680 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-3942-2 / ₹ 425.00**



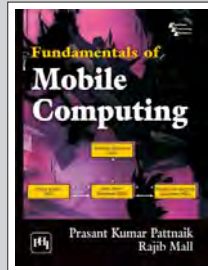
## COMPUTER SCIENCE AND ENGINEERING

### Mobile Computing

#### Fundamentals of Mobile Computing

**PRASANT KUMAR PATNAIK**,  
*Associate Professor at the School of  
Computer Engineering, KIIT  
University, Bhubaneswar.*

**RAJIB MALL**, *Professor in the  
Department of Computer Science and  
Engineering at the Indian Institute of  
Technology Kharagpur.*



This textbook addresses the main topics associated with mobile computing and wireless networking at a level that enables the students to develop a fundamental understanding of the technical issues involved in this new and fast emerging discipline.

The book first examines the basics of wireless technologies and computer communications that form the essential infrastructure required for building knowledge in the area of mobile computations involving the study of invocation mechanisms at the client end, the underlying wireless communication, and the corresponding server-side technologies.

The book includes coverage of development of mobile cellular systems, protocol design for mobile networks, special issues involved in the mobility management of cellular system users, realization and applications of mobile ad hoc networks (MANETs), design and operation of sensor networks, special constraints and requirements of mobile operating systems, and development of mobile computing applications.

Finally, an example application of the mobile computing infrastructure to M-commerce is described in the concluding chapter of the book.

This book is suitable as an introductory text for a one-semester course in mobile computing for the undergraduate students of Computer Science and Engineering, Information Technology, Electronics and Communication Engineering, Master of Computer Applications (MCA), and the undergraduate and postgraduate science courses in computer science and Information Technology.

#### KEY FEATURES

- Provides unified coverage of mobile computing and communication aspects
- Discusses the mobile application development, mobile operating systems and mobile databases as part of the material devoted to mobile computing
- Incorporates a survey of mobile operating systems and the latest developments such as the Android operating system

**CONTENTS:** Preface. Basics of Communication Technologies. Introduction to Mobile Computing. Mobile MAC Protocols. Mobile Internet Protocol. Mobile Transport Layer. Mobile Database. Mobile Ad hoc Networks. Wireless Sensor Networks. Operating Systems for Mobile Computing Devices. Mobile Commerce. WAP, Bluetooth and J2ME. Index.

Latest Print 2014 / 252 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-4632-1 / ₹ 250.00



#### Mobile Computing



**SIPRA DASBIT**, *Professor in the Department of Computer  
Science and Technology, Bengal Engineering and Science  
University, Shibpur.*

**BIPLAB K. SIKDAR**, *Assistant Professor in the Department of  
Computer Science and Technology at Bengal Engineering and  
Science University, Shibpur.*

This textbook provides students with a sound foundation in the concepts and applications of mobile computing. It discusses all the relevant topics in mobile computing in a clear and straightforward style.

The book begins with an introduction to the subject and then moves on to describe the fundamentals of wireless communication including a brief description of different modulation techniques. The text includes coverage of second generation (2G) cellular network together with its two important implementation standards GSM & IS-95; it also discusses WLL and WLAN. In addition, it presents a variety of data services available in the domain of mobile computing with other relevant issues. Finally, it gives a brief on UMTS, a representative of the third generation (3G) of cellular networks. The fundamental tenets of mobile computing, such as mobility management, channel assignment, protocols at air interface, and system design are carefully covered for all categories of wireless networks described here.

A perfect balance between theoretical aspects of mobile computing and its implementation standards has been maintained throughout the book. Many examples and exercises are included, which will help students prepare for examinations.

The book is intended primarily for students of B.E./B.Tech. of Computer Science and Engineering, Information Technology, Electronics and Communication Engineering, and related disciplines. It will also be useful to the students of BCA/MCA and B.Sc./M.Sc. (Computer Science/Electronics).

**CONTENTS:** Preface. Acknowledgements. Introduction. Wireless Wide Area Network (Cellular Network). Cellular Network Standards (GSM & IS-95). Wireless Metropolitan Area Network (Wireless Local Loop). Wireless Local Area Network. Wireless Data Service. Overview of Third Generation Cellular Network (UMTS). Index.

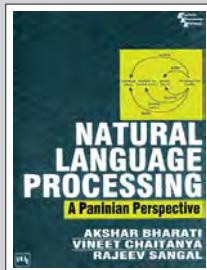
Latest Print 2010 / 192 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-3952-1 / ₹ 175.00



## Natural Language Processing: A Paninian Perspective

**AKSHAR BHARATI**, is the personification of a group working on NLP at Indian Institute of Technology Kanpur.



**VINEET CHAITANYA**, Indian Institute of Technology Kanpur.

**RAJEEV SANGAL**, Director, Indian Institute of Information Technology, Hyderabad and former Professor of Computer Science and Engineering, Indian Institute of Technology Kanpur.

This book is on Natural Language Processing presented with a Paninian perspective. *Panini* (circa 500 B.C.) was a grammarian and well known for his contribution to the grammar and structure of the language. In this book the reader is first introduced to Natural Language Processing and then to Paninian grammar and framework for processing of modern Indian languages using the computer. Thereafter, a comparison of Paninian grammar framework with that of modern western computational grammars is presented.

This book is useful for courses in *Computational Linguistics* in the linguistic departments, and for NLP in computer science departments.

### KEY FEATURES

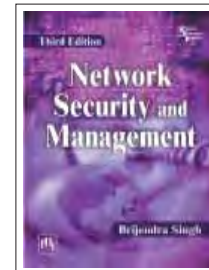
- This book is the first of its kind in presenting a comparison of Paninian Grammar (PG) with the existing modern western computational grammars.
- Introduces three western grammar frameworks using examples from English: Lexical Functional Grammar (LFG), Trees Adjoining Grammar (TAG), and Government and Binding (GB). The presentation does not assume any background on part of the reader regarding these frameworks.
- Each presentation also discusses either the applicability of the framework to *free word order* languages, or a comparison with PG framework.
- It is a single source in path-breaking research on Natural Language Processing using the classic and time-tested Paninian framework.

**CONTENTS:** List of Figures. Preface. Acknowledgements. Introduction to NLP. Language Structure and Language Analyzer. Words and Their Analyzer. Local Word Grouping. Paninian Grammar. Paninian Parser. Machine Translation. Lexical Functional Grammar. LFG and Indian Languages. Tree Adjoining Grammar. Comparing TAG with PG. Government and Binding. Comparing GB with PG. Appendices: A—Panini's Grammar and Sanskrit. B—Roman Notation for Devanagari. Bibliography. Index. Glossary.

Latest Print 2010 / 240 pp. / 15.3 × 22.9 cm  
ISBN-978-81-203-0921-0 / ₹ 175.00

## Network Security and Management, 3rd ed. (with CD-ROM)

**BRIJENDRA SINGH**, Professor, Department of Computer Science, University of Lucknow, Lucknow.



Written in an easy-to-understand style, this textbook, now in its third edition, continues to discuss in detail important concepts and major developments in network security and management. It is designed for a one-semester course for undergraduate students of Computer Science, Information Technology, and undergraduate and postgraduate students of Computer Applications.

Students are first exposed to network security principles, organizational policy and security infrastructure, and then drawn into some of the deeper issues of cryptographic algorithms and protocols underlying network security applications. Encryption methods, secret key and public key cryptography, digital signature and other security mechanisms are emphasized. Smart card, biometrics, virtual private networks, trusted operating systems, pretty good privacy, database security, and intrusion detection systems are comprehensively covered. An in-depth analysis of technical issues involved in security management, risk management and security and law is presented.

In the third edition, two new chapters—one on **Information Systems Security** and the other on **Web Security**—and many new sections such as digital signature, Kerberos, public key infrastructure, software security and electronic mail security have been included. Additional matter has also been added in many existing sections.

### KEY FEATURES

- Extensive use of block diagrams throughout helps explain and clarify the concepts discussed.
- About 250 questions and answers at the end of the book facilitate fruitful revision of the topics covered.
- Includes a glossary of important terms.

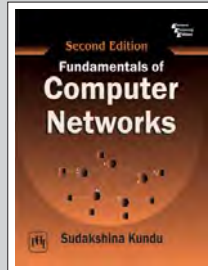
**CONTENTS:** Preface. Introduction. Organizational Policy and Security. Security Infrastructure. Cryptography. Network Fundamentals. Hardware and Software Security. Database Security. Information Systems Security. Intrusion Detection Systems. Network Security. Wireless Security. Web Security. Network Management. Security Management. Risk Management and Incident Management. Security and Law. Internet Governance and Electronic Mail Policy. Security of Internet Banking System. Appendices—A: Internet Standards and the Internet Society. B: Abbreviations and Acronyms. C: Questions and Answers. D: Glossary. Bibliography. Index.

Latest Print 2012 / 420 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4497-6 / ₹ 325.00



## Fundamentals of Computer Networks, 2nd ed.

**SUDAKSHINA KUNDU,**  
Professor and Head,  
Department of Computer  
Science & Engineering,  
West Bengal University of  
Technology.



Focused on fundamental concepts and practical applications, this book provides a strong foundation in the principles and terminology of computer networking and internet technology. This thoroughly revised **second edition**, incorporating some of the latest technical features in networking, is suitable for introductory one-semester courses for undergraduate students of computer science and engineering, electronics and telecommunication engineering, information technology, as well as students of computer applications (BCA and MCA).

This text begins with an overview of computer networking and a discussion on data communication. Then it proceeds to explain how computer networks such as local area networks (LANs) and wide area networks (WANs) work, and how internetworking is implemented. Besides, the book provides a description of the Internet and TCP/IP protocol. With the prolific growth of networking, 'network management and security' has become an increasingly important part of the academic curriculum. This topic has been adequately dealt with in a separate chapter. The practical aspects of networking, listing the essential requirements needed for actually setting up a computer network, are thoroughly explained in the final chapter of the book.

### What is New in the Second Edition

- Wireless LAN in Chapter 4
- API and Socket Programming and End-to-End Protocol in Chapter 7
- Remote Procedure Call (RPC) Protocol in Chapter 8
- Dynamic Host Configuration Protocol: Error reporting by ICMP, Virtual Private Network (VPN), Network Address Translation (NAT) in Chapter 9

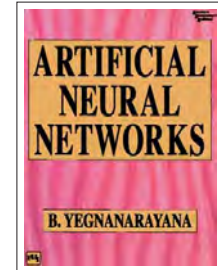
An appendix dealing with telephone networking, wireless networking, cellular networking and satellite and telemetry communication has been included to meet the requirements of the students.

**CONTENTS:** Preface. Computer Networking—An Overview. Electronic Communication of the Digital Data. Basic Principles of Networking of Computers. Transmission in Local Area Networks. Switching and Forwarding in Wide Area Networking. Internetworking. Internet and TCP/IP Protocol Suit. Network Applications. Network Management and Security. Setting up a Network. Appendix. Glossary. Index.

Latest Print 2009 / 300 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3452-6 / ₹ 225.00

## Artificial Neural Networks

**B. YEGNANARAYANA,**  
former Professor, Department of  
Computer Science and Engineering,  
Indian Institute of Technology  
Madras.



This self-contained introductory text explains the basic principles of computing with models of artificial neural networks, which the students with a background in basic engineering or physics or mathematics can easily understand. Besides students, practising engineers and research scientists would also cherish this book which treats the emerging and exciting area of artificial neural networks with the following distinguishing features:

### KEY FEATURES

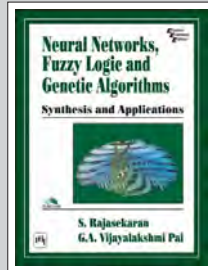
- Principles of neural networks are explained without presuming any prior knowledge of the subject.
- While pattern processing features of the neural networks are emphasised, the pattern recognition tasks used in problem solving by human beings are identified.
- Analysis of pattern recognition tasks are presented in detail by basic topologies of artificial neural networks.
- Includes real-world applications of neural networks in speech and image processing.
- The text discusses the following topics from first principles:
  - Activation and synaptic dynamics
  - Learning laws for feedforward neural networks
  - Analysis of feedback neural networks
  - Competitive learning networks
  - Architectures for complex pattern recognition tasks
  - Applications in speech and image processing.

**CONTENTS:** Preface. Acknowledgements. Introduction. Basics of Artificial Neural Networks. Activation and Synaptic Dynamics. Functional Units of ANN for Pattern Recognition Tasks. Feedforward Neural Networks. Feedback Neural Networks. Competitive Learning Neural Networks. Architectures for Complex Pattern Recognition Tasks. Applications of ANN. Appendices—A: Features of Biological Neural Networks through PDP Models. B: Mathematical Preliminaries. C: Basics of Gradient Descent Methods. D: Generalization in Neural Networks: An Overview. E: Principal Component Neural Networks: An Overview. F: Current Trends in Neural Networks. Bibliography. Author Index. Subject Index.

Latest Print 2011 / 476 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-1253-1 / ₹ 275.00



### Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis and Applications (with CD-ROM)



**S. RAJASEKARAN**, *Professor Emeritus, Department of Civil Engineering, PSG College of Technology, Coimbatore.*  
**G.A. VIJAYALAKSHMI PAI**, *Sr. Lecturer, Computer Applications, PSG College of Technology, Coimbatore.*

This book provides comprehensive introduction to a consortium of technologies underlying soft computing, an evolving branch of computational intelligence. The constituent technologies discussed comprise neural networks, fuzzy logic, genetic algorithms, and a number of hybrid systems which include classes such as neuro-fuzzy, fuzzy-genetic, and neurogenetic systems. The hybridization of the technologies is demonstrated on architectures such as Fuzzy-Back-propagation Networks (NN-FL), Simplified Fuzzy ARTMAP (NN-FL), and Fuzzy Associative Memories. The book also gives an exhaustive discussion of FL-GA hybridization.

Every architecture has been discussed in detail through illustrative examples and applications. The algorithms have been presented in pseudo-code with a step-by-step illustration of the same in problems. The applications, demonstrative of the potential of the architectures, have been chosen from diverse disciplines of science and engineering.

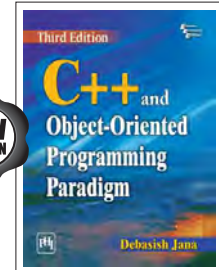
This book with a wealth of information that is clearly presented and illustrated by many examples and applications is designed for use as a text for courses in soft computing at both the senior undergraduate and first-year postgraduate engineering levels. It should also be of interest to researchers and technologists desirous of applying soft computing technologies to their respective fields of work.

**CONTENTS:** Foreword. Preface. Introduction to Artificial Intelligence Systems. Part I: Neural Networks—Fundamentals of Neural Networks. Backpropagation Networks. Associative Memory. Adaptive Resonance Theory. Part II: Fuzzy Logic—Fuzzy Set Theory. Fuzzy Systems. Part III: Genetic Algorithms—Fundamentals of Genetic Algorithms. Genetic Modelling. Part IV: Hybrid Systems—Integration of Neural Networks, Fuzzy Logic and Genetic Algorithms. Genetic Algorithm based Backpropagation Network. Fuzzy Backpropagation Network. Simplified Fuzzy ARTMAP. Fuzzy Associative Memories. Fuzzy Logic Controlled Genetic Algorithms. Word Index. Author Index.

**Latest Print 2014 / 456 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-2186-1 / ` 350.00**

*PHI Learning: Publications*

### C++ and Object- Oriented Programming Paradigm, 3rd ed.



**DEBASISH JANA**, *Manager, Software Development with TEOCO Software, Kolkata.*

Earlier two editions of this practice-oriented book have been well accepted over the past decade by students, teachers and professionals. Inspired by the avid response, the author is enthused to bring out the third edition, improving upon the concepts with glimpses of C++11 features. This book presents a unique blending of C++ as one of the most widely used programming languages of today in the backdrop of object-oriented programming (OOP) paradigm and modelling. Along with an overview of C++ programming and basic object-oriented (OO) concepts, it also provides the standard and advanced features of C++ for further study. The text establishes the philosophy of OOP by highlighting the core features of C++ and demonstrating the semantic differences between the procedural paradigm of C and the object-oriented paradigm of C++.

The present edition updates and elaborates on the following topics:

- Reference data types
- Inline functions
- Parameter passing—passing pointers by value as well as by reference
- Polymorphism: overloading and overriding
- Lambda expressions and anonymous functions
- Rvalue reference, move constructor and assignment operator
- Phases of software development
- UML

Primarily intended as a text for undergraduate and postgraduate students of engineering, computer applications and management, and also to practicing professionals, the book should also prove to be a stimulating study as a reference for all those who have a keen interest in the subject.

**CONTENTS:** Preface. Acknowledgements. Overview. Declarations and Expressions. Statements. Array, Pointer and Structure. Functions. Preprocessor Directives. Standard C Library Functions and Standard Header Files. Data Abstraction through Classes and User-Defined Data Types. Operator Overloading. Class Relationships. Advanced Concepts. The Standard Library in C++. Data Structures and Applications in C++. Object-Oriented Design and Modeling. Unified Modeling Language. Problems (For Laboratory Workouts). Glossary. Bibliography. Index.

**Latest Print 2014 / 568 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-5033-5 / ` 495.00**

## COMPUTER SCIENCE AND ENGINEERING

### Object-Oriented Programming

#### Java and Object-Oriented Programming Paradigm

**DEBASISH JANA**, *Principal Software Engineer, Anshin Software Pvt. Ltd.*



This practice-oriented text explores the intricacies of Java language in the light of different procedural and object-oriented paradigms. It is primarily focussed on the Object-Oriented Programming (OOP) paradigm using Java as a language.

The text begins with the programming overview and introduces the reader to the important object-oriented (OO) terms. It then deals with Java development as well as runtime environment set-up along with the steps of compilation and running of a simple program. The text explains the philosophy of Java by highlighting its core features and demonstrating its advantages over C++. Besides, it covers GUI through Java applets, Swing, as well as concurrency handling and synchronization through threads. A chapter is exclusively devoted to fundamental data structures and their applications in Java. The book shows how Unified Modeling Language (UML) represents objects, classes, components, relationships, and architectural design.

This comprehensive and student friendly book is intended as a text for the students of computer science and engineering, computer applications (BCA/MCA), and IT courses.

#### KEY FEATURES

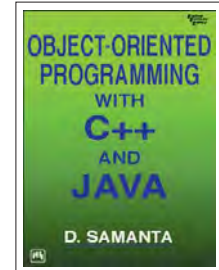
- Shows the practical application of theories through several examples and program source codes.
- Provides end-of-chapter review questions and end-of-book laboratory workouts for easy assimilation of concepts learned and self-evaluation.
- Covers the features of latest version of Java, i.e. Java™ 2 Platform Standard Edition (J2SE) 5.0.

**CONTENTS:** Preface. Acknowledgements. Overview. Data Types and Expressions. Statements. Arrays. Methods or Functions. Data Abstraction Through Classes. Class Relationships. Multithreading. Java Standard Packages and Classes. Input and Output. Applet. Swing. Data Structures and Applications in Java. Object-Oriented Design and Modeling. Unified Modeling Language. Additional Problems. Appendix. Index.

Latest Print 2014 / 652 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2775-7 / ₹ 450.00



#### Object-Oriented Programming with C++ and Java



**D. SAMANTA**, *Assistant Professor, School of Information Technology, Indian Institute of Technology Kharagpur.*

This book is designed to introduce object-oriented programming (OOP) in C++ and Java, and is divided into four areas of coverage:

**Preliminaries:** Explains the basic features of C, C++, and Java such as data types, operators, control structures, storage classes, and array structures.

**Part I:** Covers classes, objects, data abstraction, function overloading, information hiding, memory management, inheritance, binding, polymorphism, class template using working illustrations based on simple concepts.

**Part II:** Discusses all the paradigms of Java programming with ready-to-use programs.

**Part III:** Contains eight Java packages with their full structures.

The book offers straightforward explanations of the concepts of OOP and discusses the use of C++ and Java in OOP through small but effective illustrations. It is ideally suited for undergraduate/postgraduate courses in computer science. The IT professionals should also find the book useful.

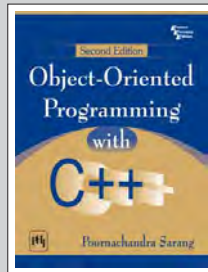
**CONTENTS:** Preface. Preliminaries—Basics of C/C++/Java. Part I—Getting Started. Overloading and Information Hiding. Memory Management in C++. Inheritance. Binding and Polymorphism. Generic Facility. File Handling in C++. Part II—Fundamentals of Java. Programming with Java. Object-Oriented Machine in Java. Interface and Package. Exception Handling in Java. Thread and Multithreading. Application Development with Java. Java Input/Output Networking. Java Multimedia. Part III—The Java Applet Package. The Java Language Package. The Java Utility Package. The Abstract Window Toolkit (AWT) Package. The AWT Image Package. The AWT Peer Package. The Java I/O Package. The Java Networking Package.

Latest Print 2009 / 344 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-1620-1 / ₹ 225.00

## COMPUTER SCIENCE AND ENGINEERING

### Object-Oriented Programming

#### Object-oriented Programming with C++, 2nd ed.



**POORNACHANDRA SARANG** has been a Visiting Professor of Computer Engineering at the University of Notre Dame, USA and currently holds a position of adjunct Faculty at the Department of Computer Science, University of Mumbai.

Written in a style that is both engaging and understandable, this second edition benefits from Dr. Sarang's many years of teaching computer science students as well as providing consultancy in designing and architecting programming solutions. It is an ideal text for beginners, developed to meet the needs of the students for a comprehensive introduction to object-oriented programming using C++.

The book covers the full range of object-oriented topics, from the fundamental features through classes, inheritance, polymorphism, and templates. It uses a practical problem-solving approach to drive home the essential concepts and principles of object-oriented programming, helping the readers to build a strong foundation in design and implementation of software solutions.

#### KEY FEATURES OF THE NEW EDITION

- Provides a full chapter on string class
- Several newly added programming examples
- Shows the screen output of each program for ease of learning
- Provides support for both Microsoft Visual C++ and Turbo C++ so that the students can run the programs in an environment of their choice

#### This book is appropriate for learning C++ by:

- students of computer science
- students of computer applications
- students of Information Communication Technology (ICT)
- students of all engineering disciplines

**CONTENTS:** Preface. Preface to the First Edition. Acknowledgements. Object-Oriented Programming Concepts. Language Constructs. Advanced Constructs. Classes in C++. Member Functions. Operator Overloading. Constructors and Destructors. Inheritance. Multiple Inheritance. Polymorphism. Handling Exceptions. Templates. C++ I/O. Strings. Appendices. Index.

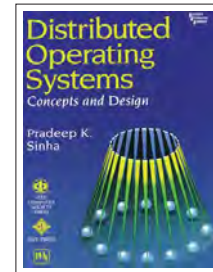
Latest Print 2011 / 372 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3670-4 / ₹ 250.00



PHI Learning: Publications

### Operating Systems

#### Distributed Operating Systems: Concepts and Design



**PRADEEP K. SINHA**, Centre for Development of Advanced Computing (C-DAC), Pune.

This highly praised book in communications networking from IEEE Press, is now available in the Eastern Economy Edition.

This is a non-mathematical introduction to Distributed Operating Systems explaining the fundamental concepts and design principles of this emerging technology. As a textbook for students and as a self-study text for systems managers and software engineers, this book provides a concise and an informal introduction to the subject.

Each chapter addresses de-facto standards, popular technologies, and design principles applicable to a wide variety of systems. Complete with chapter summaries, end-of-chapter exercises and bibliographies, the book concludes with a set of *case studies* that provide *real-world* insights into four distributed operating systems. The reader will find comprehensive coverage of all major issues in the field:

- Inter-process communication
- Distributed shared memory
- Synchronization
- Resource and process management
- File management
- Naming and security
- A multitude of design options, and more

**CONTENTS:** Preface. Acknowledgments. Abbreviations and Acronyms. Fundamentals. Computer Networks. Message Passing. Remote Procedure Calls. Distributed Shared Memory. Synchronization. Resource Management. Process Management. Distributed File Systems. Naming. Security. Case Studies. Index.

Latest Print 2014 / 764 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-1380-4 / ₹ 450.00



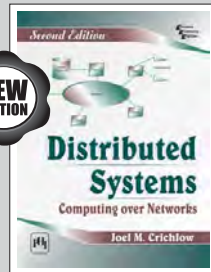


## COMPUTER SCIENCE AND ENGINEERING

### Operating Systems

#### Distributed Systems: Computing Over Networks, 2nd ed.

**JOEL M. CRICHLAW,**  
*Associate Professor of Computer Science at Rowan University, Glassboro, New Jersey (U.S.A.).*



Intended as a textbook for undergraduate students of computer science, computer science and engineering, and information technology for a course on distributed systems/operating systems, this up-to-date text provides a thorough understanding of the fundamental principles and technologies pertinent to the design and construction of the distributed systems.

Beginning with an introduction to the subject, the book discusses the techniques of software and network architectures and presents the issues pertaining to the handling and accessing of resources. This also focuses on major application areas. Finally, the book provides the examples for explaining the concepts discussed.

The book would also be useful to postgraduate students of computer science, computer science and engineering, and information technology as well as to postgraduate students of computer applications. The book can also be used by software engineers, programmers, analysts, scientists and researchers for reference.

#### NEW TO THIS EDITION

This second edition highlights some of the latest distributed system technologies. It includes discussions on:

- Cloud Computing
- Social Networks
- Big Data

In addition to this, it presents some current key software tools, viz. BitTorrent, Amazon Dynamo, Amazon DynamoDB, Apache Cassandra, Apache Server, Apache Zookeeper, Google BigTable and others.

#### KEY FEATURES

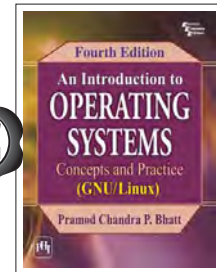
- Introduces Internet, The World Wide Web, Web services and network technologies, viz. WAN, LAN and MAN.
- Discusses software development tools, like PVM, MPI, DCE, CORBA and the Globus toolkit.
- Provides discussions on network protocol suites, i.e. TCP/IP, SMTP and HTTP.
- Deals with grid computing, wireless computing and client-server model.
- Presents applications of NFS, Coda, Microsoft SQL Server, Oracle, Amoeba, Chorus, Mach, Windows NT and Orbix technologies.
- Emphasizes the programming languages, like Ada, C++ and Java.

**CONTENTS:** Preface. Introduction. Software Architecture for Distributed Systems. Network Architecture for Distributed Systems. Managing Distributed Resources. Accessing Distributed Resources. Major Application Areas for Distributed Systems. Some Examples of Distributed Systems. Glossary. Index.



Latest Print 2014 / 208 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4877-6 / ₹ 225.00

#### Introduction to Operating Systems, An: Concepts and Practice, 4th ed.



**PRAMOD CHANDRA P. BHATT,**

*has been a consultant to several companies (Intel, IBM, Accenture, Philips, Sharp, Satyam, ABB) and Advisor to the India Semiconductor Association.*

Divided into four parts—OS concepts, practice, architecture of contemporary operating systems and projects on OS—this **fourth edition** offers a comprehensive treatment of operating systems. While Unix and Windows are covered in good detail, this edition emphasizes changes that have occurred in design technology and pattern of use. The new edition, comes with focus on Linux kernel, VxWorks and operating systems for handheld systems. These changes make the book contemporary. A set of mini-projects have been incorporated to help students to put to practice the mechanisms that they have learned. The book is intended for the undergraduate students of computer science and engineering, computer applications, and information technology.

#### NEW IN THIS EDITION

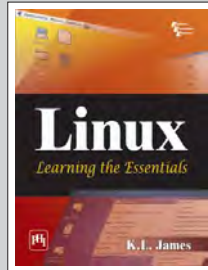
- A chapter on File Systems has been thoroughly updated and is included with flash memory
- The chapter on IO has been updated to include some preferred bus interfaces and protocols
- The chapters on interprocess communication and distributed computing have been revised and rewritten in parts
- The Chapter on Linux have been revised and rewritten, where the emphasis has been shifted to kernel description and programming.
- An Appendix on Time has been added.

**CONTENTS:** Foreword. Preface. Preface to First Edition. Part I—OS: CONCEPTS—Introduction to Operating Systems. File Systems and Management. Process and Process Management. Memory Management. Input Output (IO) Management. Resource Sharing and Management. Interprocess Communication. Distributed Computing. Real-Time Operating Systems and Microkernels. OS and Security. Recent Trends in OS. Part II—OS: UNIX IN PRACTICE—Unix Primer. Search and Sort Tools. AWK Tool in Unix. Shell Scripts in Unix. Programming with Threads. Unix Kernel Architecture. Make Tool in Unix. Some Other Tools in Unix. Source Code Control System in Unix. X-Windows in Unix. System Administration in Unix. Part III—CONTEMPORARY OPERATING SYSTEMS—Linux. Windows Operating Systems. Vista Operating System. VxWorks Operating System. Operating Systems for Handheld Systems. Part IV—PROJECT AND QUESTION BANK—Case Studies and Project Ideas. Question Bank. References. Index.

Latest Print 2014 / 852 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4836-3 / ₹ 450.00



## Linux: Learning the Essentials



**K.L. JAMES**, *Technical Officer at the Computer Centre in University of Kerala, Thiruvananthapuram.*

This book aims at providing a thorough understanding of the essentials and the workings of Linux Operating System (OS). It explores the technicalities of this free and open source OS so as to enable readers to harness the full power of Linux.

The text gives a methodical insight into Linux. Beginning with an introduction to Linux, the book discusses its salient features, different stages of its development, its basic operations and installation steps, and then describes the desktop environments, file management, administration, and basic Linux commands. In addition, chapters are written on different applications of Linux such as graphics, audio/video, gaming and internet, along with their usage details.

Presented in a simple and engaging style, the book is ideal for all computer courses covering the fundamentals of the Linux Operating System, or where Linux forms the core subject. It is ideally suited for self-learning by beginners who can acquire skills in Linux OS in their own desktop environment at home.

**KEY FEATURES**

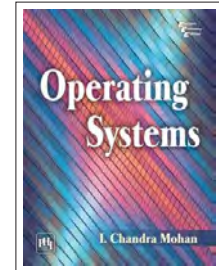
1. Gives a comprehensive understanding and working details of Linux.
2. Devotes exclusive chapters on Gimp Image Editor and OpenOffice.org Applications.
3. Provides step-by-step instructions on essential applications used in Linux to help gain hands-on experience.

**CONTENTS:** Preface. An Introduction to Linux. Linux Distributions and Installation. Linux Desktop Environments. Getting Started in Linux. Managing Linux Files and Folders. Linux Administration Basics. Command Line Operations and Shell Scripts. Linux Text Editors. Linux Graphics Applications. Linux Audio and Video Applications. Linux Gaming Applications. Networking and Using the Internet. Applications Development in Linux. Gimp Image Editor. OpenOffice.org Applications. Index.



**Latest Print 2013 / 336 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-4475-4 / ₹ 350.00**

## Operating Systems



**I. CHANDRA MOHAN**, *was Professor and Head, Department of Mathematics, S.V. University, Tirupati.*

Operating System, an integral part of any computer, is the interface between the computer users and the hardware. This comprehensive book provides the readers with the basic understanding of the theoretical and practical aspects of operating systems.

The text explains the operating systems and components of operating systems including attributes of Linux and Unix operating systems. It also discusses Android operating system and Tablet computer. The book explicates in-depth the concepts of process, threads/multithreading and scheduling and describes process synchronization, deadlocks and memory management including file access methods and directory structure. In addition, it also describes security and protection along with distributed file systems.

The book is designed as a textbook for undergraduate students of Electronics and Communication Engineering, Computer Science and Engineering, and Information Technology as well as postgraduate students of computer applications and computer science.

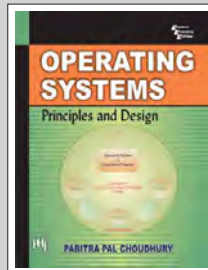
**CONTENTS:** Preface. Operating Systems—An Overview. Process Management. Concurrency and Process Synchronization. Deadlocks. Memory Management. Files System Interface and Implementation. Protection and Security. Distributed Systems. Index.

**Latest Print 2013 / 236 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-4726-7 / ₹ 250.00**



## Operating Systems: Principles and Design

**PABITRA PAL CHOUDHURY**,  
faculty at Applied Statistics Unit,  
Indian Statistical Institute, Kolkata.



This well-organized and comprehensive book, written in an easy-to-understand language, provides a deep insight into the working of an operating system, which is essentially a concurrent program, and strikes a fine balance between theory and practice.

The text provides the program design illustration and guidance along with new concepts. It gives an in-depth analysis of the fundamental concepts of an OS as an interrupt driven program whose basic constituents are the processes giving rise to a concurrent program. Further, the book gives a comprehensive coverage of such topics as CPU scheduling, device scheduling, deadlocks, memory management, file system, and the considerations of the security of the whole system. The programs discussed in the text are in C language and have been successfully run and tested in the Linux operating system.

### KEY FEATURES

- Devotes separate chapters to device management, file management, and low power system design.
- Discusses ReiserFs, a file system (considered to be an asset), which is given as an Appendix to Chapter 10.
- Includes a detailed discussion on how a programmer can guard against hacking Linux and its clones.

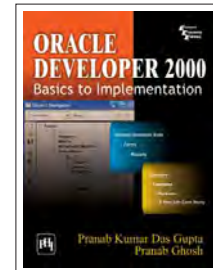
This student friendly book, with profuse use of illustrative programs, is intended as a text for undergraduate and postgraduate students pursuing courses in Computer Science and Engineering, Information Technology, Computer Applications (BCA, MCA), and Computer Science (B.Sc. and M.Sc.). Besides, students from other engineering streams who wish to keep themselves abreast of operating systems would also find the text immensely valuable.

**CONTENTS:** Preface. Acknowledgement. Introduction to the Operating System. OS Prerequisites. Concurrent Processing. Scheduling. Discussion on Concurrency Control. Deadlock. Main Memory Management. Virtual Memory Technique. Spooler and Disk Scheduling. File System Architecture. Device Driver for Operating System. Linux Kernel and Security. Role of OS towards Low Power Design. Bibliography. Index.



Latest Print 2011 / 656 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3811-1 / ₹ 325.00

## Oracle Developer 2000: Basics to Implementation (with CD-ROM)



**PRANAB KUMAR DAS GUPTA**, Senior Scientist in Defence Research and Development Organization (DRDO). Presently he is Deputy Director (Computer Wing) at Proof and Experimental Establishment, Chandipur.

**PRANAB GHOSH**, Scientist in Defence Research and Development Organization (DRDO). Presently he is Assistant Director (Computer Wing) at Proof and Experimental Establishment, Chandipur.

The objective of this book is to cater to the needs of the students and professionals aspiring to become Oracle software developers. It covers the basics of Oracle Developer 2000, and exposes the readers to its important features and tools for application development. The concepts are explained with the help of numerous illustrations. Workout sections and case studies are designed to provide a real-life experience of development of application software.

The book is most suitable for beginners, including the students pursuing courses in engineering disciplines (B.Tech/M.Tech) and computer applications (MCA/BCA) and research students who wish to learn and master Oracle Developer 2000 for writing project reports and dissertations. Professionals, too, can learn and explore Oracle Developer, using this book as a guide.

### CD-ROM Features:

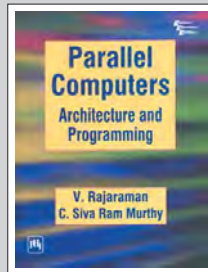
- Contains programs of Examples, Workouts and Case Studies
- Programs are compatible with Oracle 8i, 9i and 10g

**CONTENTS:** Preface. Acknowledgements. Basics of Forms Builder. Form Components. List of Values, Editor, Visual Attribute, Input and Non-input Items. Trigger, Message and Alert. Advanced Triggers. Menu, Function Key, Mouse and Timer. Windows and Multiple Forms. Basics of Report Builder. Using Report Wizard. Manual Development of Reports. Case Study: Digital Message Board—An Introduction. Case Study: Digital Message Board—Software Development. *Appendix A: Installation of Oracle Database and Developer 2000 (Forms and Reports)*. *Appendix B: Tables Used in the Book*. *Appendix C: Trigger Category*. Index.

Latest Print 2008 / 600 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3510-3 / ₹ 425.00



### Parallel Computers: Architecture and Programming



**V. RAJARAMAN**, *Honorary Professor, Supercomputer Education and Research Centre, Indian Institute of Science, Bangalore.*

**C. SIVA RAM MURTHY**, *Associate Professor of Computer Science, Indian Institute of Technology Madras, Chennai.*

Today, parallel computing arouses enormous interest among students and professionals as it is clear that, as the new millennium progresses, all computers will work in parallel. A basic knowledge of the design and use of parallel computers is, therefore, essential for both students of computing and users of computers.

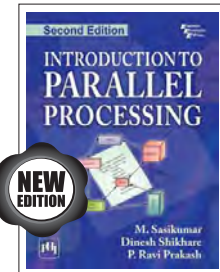
Designed as an introductory-level textbook for the final year undergraduate students of computer science and engineering, this well-organized book covers state-of-the-art principles and techniques for designing and programming parallel computers. The book begins with an introduction to the current state and developments in parallel computing, then it goes on to give a detailed discussion on such topics as instruction level parallel processing, architecture of parallel computers, parallel algorithms and parallel programming. Besides, the book gives an in-depth coverage of compiler transformations and operating systems for parallel computers. The text concludes with a chapter on performance evaluation of parallel computers.

Interspersed with copious examples and numerous exercises, this timely book should prove to be a handy and treasured volume for students as well as professionals.

**CONTENTS:** Preface. Introduction. Solving Problems in Parallel. Instruction Level Parallel Processing. Structure of Parallel Computers. Parallel Algorithms. Parallel Programming. Compiler Transformations for Parallel Computers. Operating Systems for Parallel Computers. Performance Evaluation of Parallel Computers. Appendix. Index.

**Latest Print 2013 / 388 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-1621-8 / ₹ 295.00**

### Introduction to Parallel Processing, 2nd ed.



**M. SASIKUMAR, DINESH SHIKHARE and P. RAVI PRAKASH** *all three with NCST Mumbai (now part of C-DAC).*

Written with a straightforward and student-centred approach, this extensively revised, updated and enlarged edition presents a thorough coverage of the various aspects of parallel processing including parallel processing architectures, programmability issues, data dependency analysis, shared memory programming, thread-based implementation, distributed computing, algorithms, parallel programming languages, debugging, parallelism paradigms, distributed databases as well as distributed operating systems.

The book, now in its second edition, not only provides sufficient practical exposure to the programming issues but also enables its readers to make realistic attempts at writing parallel programs using easily available software tools.

With all the latest information incorporated and several key pedagogical attributes included, this textbook is an invaluable learning tool for the undergraduate and postgraduate students of computer science and engineering. It also caters to the students pursuing master of computer application.

#### WHAT'S NEW TO THE SECOND EDITION

- A new chapter named *Using Parallelism Effectively* has been added covering a case study of parallelising a sorting program, and introducing commonly used parallelism models.
- Sections describing the map-reduce model, top-500.org initiative, Indian efforts in supercomputing, OpenMP system for shared memory programming, etc. have been added.
- Numerous sections have been updated with current information.
- Several questions have been incorporated in the chapter-end exercises to guide students from examination and practice points of view.

**CONTENTS:** Preface. Preface to the First Edition. Introduction. Parallel Processing Architectures. Programmability Issues. Data Dependency Analysis. Shared Memory Programming. Thread-based Implementation. Distributed Computing-I: Message Passing Model. Distributed Computing-II: Remote Procedure Call. Using Parallelism Effectively. Algorithms for Parallel Machines. Parallel Programming Languages. Debugging Parallel Programs. Other Parallelism Paradigms. Distributed Data Bases. Distributed Operating Systems. Appendices—A: POSIX Threads Reference. B: PVM Reference. C: UNIX Library for Shared Memory Abstraction. D: Programming Assignments. Bibliography. Index.

**Latest Print 2014 / 276 pp. / 16.0 × 24.1 cm**  
**ISBN-978-81-203-5031-1 / ₹ 325.00**



## COMPUTER SCIENCE AND ENGINEERING

### PC Hardware

#### Computer Hardware: Installation, Interfacing, Troubleshooting and Maintenance

**K.L. JAMES** is a Technical Officer at the Computer Centre in University of Kerala, Thiruvananthapuram.



*Computer Hardware: Installation, Interfacing, Troubleshooting and Maintenance* is a comprehensive and well-organised book that provides sufficient guidelines and proper directions for assembling and upgrading the computer systems, interfacing the computers with peripheral devices as well as for installing the new devices. Apart from this, the book also covers various preventive and corrective steps required for the regular maintenance of computer system as well as the steps that are to be followed for troubleshooting.

The text highlights different specification parameters associated with the computer and its peripherals. Also, an understanding of the technical jargon is conveyed by this book. Special coverage of laptops, printers and scanners makes this book highly modernised.

The book is designed with a practice-oriented approach supported with sufficient photographs and it covers even the minute aspects of the concepts.

Following a simple and engaging style, this book is designed for the undergraduate students of Computer Science and Computer Maintenance. In addition to this, the book is also very useful for the students pursuing Diploma courses in Computer Engineering, Hardware and Troubleshooting as well as for the students of Postgraduate Diploma in Hardware Technology and Application.

#### KEY FEATURES

- Quick and easy approach to learn the theoretical concepts and practical skills related with the computer hardware.
- Comprehensive with enough illustrations to facilitate an easy understanding.
- Detailed solutions provided by the experts for certain common problems to make better interaction with the learner.
- An exclusive section *Common Problems and Solutions* to help in self resolving the general hardware related issues.

**CONTENTS:** Preface. Acknowledgements. An Introduction to Computer Hardware. Disassembling Computers. Motherboards. Processing Units. Memory and Storage. Power Supply and UPS. Computer Monitors. Keyboard and Mouse. Assembling and Configuring Computers. Troubleshooting and Maintenance. Laptops Troubleshooting and Maintenance. Computer Printers. Scanners and Speakers. Appendix 1: Worksheet. Appendix 2: Test Your Knowledge. Index.

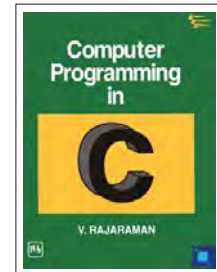


Latest Print 2013 / 304 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4798-4 / ` 250.00

### Programming

#### Computer Programming in C

**V. RAJARAMAN**, *Honorary Professor, Supercomputer Education and Research Centre, Indian Institute of Science, Bangalore.*



This book introduces computer programming to a beginner using the programming language C. The version of C used is the one standardised by the American National Standards Institute (ANSI C). C has rapidly gained users due to its efficiency, rich data structure, variety of operators and affinity to the UNIX operating system. C is a difficult language to learn if it is not methodically approached. The attempt has been to introduce the basic aspects of C to enable the student to quickly start writing C programs and postpone more difficult features of C to later chapters. The methodology of presentation closely follows the one used by the author in his popular book on PASCAL programming. Those who know PASCAL will find it very easy to learn C using this book.

#### KEY FEATURES

- A self-contained introduction to programming in C for beginners.
- All important programming language features illustrated with over 100 example programs.
- Good style in programming emphasised.
- Eminently suitable for self-study.

**CONTENTS:** Preface. Computer Algorithms. Flow Charts. Programming Preliminaries. Simple Computer Programs. Numeric Constants and Variables. Arithmetic Expressions. Input and Output in C Programs. Conditional Statements. Implementing Loops in Programs. Defining and Manipulating Arrays. Logical Expressions and More Control Statements. C Program Examples. Functions. Processing Character Strings. Enumerated Data Types and Stacks. Structures. Pointer Data Type and Applications. Lists and Trees. Recursion. Bit Level Operations and Applications. Files in C. Miscellaneous Features in C. Appendices. Compiling and Running C Programs in Unix. Reserved Words in C. Mathematical Functions. String Functions. Character Class Tests. File Manipulation Functions. Utility Functions. Summary of C Language. Index. References. Index.

Latest Print 2012 / 372 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-0859-6 / ` 250.00

**Computer Programming in FORTRAN 77 (With an Introduction to FORTRAN 90), 4th ed.**



**V. RAJARAMAN**, *Honorary Professor, Supercomputer Education and Research Centre, Indian Institute of Science, Bangalore.*

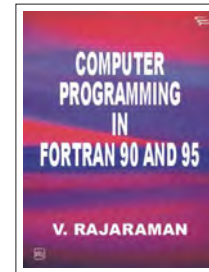
This book is the revised and enlarged version of the author's widely acclaimed book *Computer Programming in FORTRAN 77* (Prentice-Hall of India, 1988). In its fourth edition, the major addition is a chapter on FORTRAN 90 which has recently emerged as a new standard. The obsolete features of FORTRAN 77 have therefore been pointed out throughout the text and finally consolidated in an Appendix. However, *all* FORTRAN 77 programs written adhering to ANSI standard (without using the obsolete features) are executable without change in FORTRAN 90 compilers. Thus FORTRAN 77 will continue to be used for sometime.

As with the previous editions, this book introduces the basic concepts of computer programming using FORTRAN 77 language. The style of presentation is simple and elucidative and suitable for self study. The concepts introduced have been illustrated with worked example programs, written using the structured programming style. The worked examples have been tested using the ANSI FORTRAN 99 compiler.

**CONTENTS:** Preface. Computer Oriented Procedures. Flow Charts. Fortran Programming Preliminaries. Fortran Constants and Variables. Arithmetic Expressions. Input-Output Statements. Simple Computer Programs. Control Statements. The DO Statement. Subscripted Variables. Elementary Format Specifications. Logical Expressions and Decision Tables. Fortran Program Examples. Functions and Subroutines. Processing Files in Fortran. Character Manipulation in Fortran. Miscellaneous FORTRAN 77 Features. Introduction to Fortran 90. APPENDICES— I: Built-in Functions in FORTRAN. II: Summary of FORTRAN 77 Features. III: Obsolete Features of FORTRAN 77. IV: References. Index.

**Latest Print 2013 / 208 pp. / 21.6 × 27.8 cm  
ISBN-978-81-203-1172-5 / ` 225.00**

**Computer Programming in FORTRAN 90 and 95**



**V. RAJARAMAN**, *Honorary Professor, Supercomputer Education and Research Centre, Indian Institute of Science, Bangalore.*

This book introduces computer programming to a beginner using FORTRAN 90 and its recent extension FORTRAN 95. While FORTRAN 77 has been used for many years and is still very popular, the International Standards Organization set up a group to 'modernize' FORTRAN and introduce new features which have made languages such as Pascal and C popular. The committee came up with the new standard, FORTRAN 90, which has introduced many new features in FORTRAN such as recursion, pointers, user defined data types, etc., hitherto available only in Pascal and C. FORTRAN 90 is not an evolutionary change of FORTRAN 77 but is drastically different. Though FORTRAN 77 programs can be run using a FORTRAN 90 compiler, FORTRAN 90 is so different that the author felt it was a good idea to introduce FORTRAN 90 from basics. In 1996, some small extensions were made to FORTRAN 90 and called FORTRAN 95. This book also discusses these features. As all new programs in FORTRAN will henceforth be written in FORTRAN 90, it is essential for students to learn this language.

One of the main merits of the book is that every concept in the language has been illustrated with an appropriate example program. This approach makes the book eminently suitable for self-study as well.

**CONTENTS:** Preface. Evolution of FORTRAN. Simple FORTRAN 90 Programs. Numeric Constants and Variables. Arithmetic Expressions. Input-Output Statements. Conditional Statements. Implementing Loops in Programs. Logical Expressions and More Control Statements. Functions and Subroutines—Basics. Defining and Manipulating Arrays. Elementary Format Specifications. Processing Strings of Characters. Program Examples. Procedures with Array Arguments. Derived Types. Additional Features in Procedures. Processing Files in FORTRAN. Pointer Data Types and Applications. Use of Modules. Miscellaneous Features of FORTRAN 90. Additional Features of FORTRAN 95. Appendices—A: Intrinsic Procedures in FORTRAN 90. B: Statement Order in FORTRAN 90. C: Statement of FORTRAN 77 declared as Obsolete in Fortran 95. D: New FORTRAN 90/95 Features compared with FORTRAN 77. References. Index.

**Latest Print 2013 / 364 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-1181-7 / ` 250.00**

## Write Your First Program

AMIT SAHA, *Software Engineer with Red Hat Inc., Brisbane, Australia.*



This introductory book on programming introduces computer programming using the C and Python programming languages on Microsoft Windows and Linux operating systems to beginners. The book assumes no familiarity with programming and teaches the basics of programming to its readers. It helps the readers to write programs to solve problems in computer science, finance, mathematics or physics.

Unlike other introductory guides to programming, *Write Your First Program* focuses on the exact information that beginners are required to apply while creating practical programs. The book is organized in eight chapters—with each chapter introducing a major programming topic, focusing on the concepts and then implementing them in both the languages. This book will teach you to write your first program and progress on to concepts such as working with data, decision making, persistent data storage and implementing mathematical operations. Apart from programming, the book also discusses version control systems and open source projects.

The aim of the book is to focus on the programming logic, and then see how the logic can be implemented using two different languages. Thus, it helps the readers to learn two vastly different ways of programming. This book is intended for all those who are interested to learn/sharpen their programming skills.

### Companion Website

The website for this book ([www.phindia.com/saha](http://www.phindia.com/saha)) is an integral part of the book where you will find:

- Extended treatment of certain topics
- Additional tips and tutorials
- Questions and comments page

**CONTENTS:** Preface. Acknowledgements. Getting Started. Variables, Memory Allocation and Pointers. Basic Programming Constructs. Data Structures. File Handling and Persistent Storage. Mathematical Functions. Advanced Topics. The Road Ahead. Appendix A: C Programming Resources. Appendix B: Python Programming Resources. Appendix C: Miscellaneous. Index.



Latest Print 2013 / 248 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4741-0 / ₹ 250.00

## Fundamentals of Software Engineering, 4th ed.

RAJIB MALL, *Professor, Department of Computer Science and Engineering, IIT Kharagpur.*



Advancements and rapid developments have led to many ramifications in the ever-changing world of software engineering. This book, in its fourth edition, is restructured and extensively revised to trace the advancements made and landmarks achieved in the field. This book not only incorporates latest and enhanced software engineering techniques and practices but also shows how these techniques are applied into the practical software assignments. The chapters are incorporated with illustrative examples to add an analytical insight on the subject. The book is logically organised to cover expanded and revised treatment of all software process activities.

### NEW TO THIS EDITION

- The contents and presentation of all chapters have been improved thoroughly.
- Objective type questions have been included in all the chapters.
- More practice questions have been added to help students understanding the concepts readily.
- McCall's quality factors and ISO 9126 have been introduced in the chapter dealing with software quality assurance (Chapter 11).

Primarily intended for the undergraduate students of Computer Science and Engineering, the book is also beneficial for the students opting for a course in MCA, MBA and IT.

### KEY FEATURES

- Large number of worked-out examples and practice problems.
- Chapter-end exercises and solutions to selected problems to check students' comprehension on the subject.
- Solutions manual available for instructors.
- PowerPoint slides available online at [www.phindia.com/rajibmall](http://www.phindia.com/rajibmall) to provide integrated learning to the students.

**CONTENTS:** Preface. Introduction. Software Life Cycle Models. Software Project Management. Requirements Analysis and Specification. Software Design. Function-oriented Software Design. Object Modelling Using UML. Object-Oriented Software Development. User Interface Design. Coding and Testing. Software Reliability and Quality Management. Computer Aided Software Engineering. Software Maintenance. Software Reuse. Emerging Trends. References. Index.

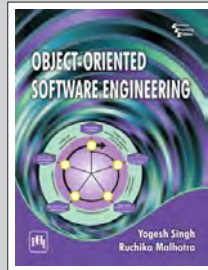
Latest Print 2014 / 556 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4898-1 / ₹ 325.00



## COMPUTER SCIENCE AND ENGINEERING

### Software Engineering

#### Object-Oriented Software Engineering



**YOGESH SINGH**, *Vice Chancellor, The Maharaja Sayajirao University of Baroda, Vadodra, Gujarat.*

**RUCHIKA MALHOTRA**, *Assistant Professor, Department of Software Engineering, Delhi Technological University, Delhi.*

This book is designed for the undergraduate and post-graduate students of computer science and engineering, information technology and MCA.

The text focuses on object-oriented software engineering in the context of an overall effort to present object-oriented concepts, techniques and models that can be applied in software estimation, analysis, design, testing and quality improvement. It presents traditional and object-oriented software development life cycle models with a special focus on rational unified process model. It explains the type of classes, their relationships and structures using unified modelling language notations. The text addresses the important issues of improving software quality and measuring various object-oriented constructs using object-oriented metrics. Finally, it analyses the importance of object-oriented testing and maintenance of software developed using object-oriented software engineering techniques and methods.

The book includes a number of solved examples, multiple choice questions, review questions and case studies. The concepts and models explained and developed in this book are demonstrated using a real-life case study of library management system.

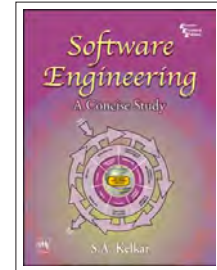
**CONTENTS:** Preface. Introduction. Software Development Life Cycle Models. Software Requirements Elicitation and Analysis. Object-Oriented Software Estimation. Object-Oriented Analysis. Object-Oriented Design. Moving towards Implementation. Software Quality and Metrics. Software Testing. Software Maintenance. References. Appendix. Answers to Multiple Choice Questions.

Latest Print 2012 / 312 pp. / 17.8 x 23.5 cm

ISBN-978-81-203-4535-5 / ₹ 350.00



#### Software Engineering: A Concise Study



**S.A. KELKAR**, *Former Adjunct Professor, Department of Computer Science and Engineering as well as at the Shailesh J. Mehta School of Management, IIT Bombay.*

This book presents the essentials of theory and practice of software engineering in an abstracted form. Presenting the information based on software development life cycle, the text guides the students through all the stages of software production—Requirements, Designing, Construction, Testing and Maintenance.

#### KEY FEATURES

- Emphasizes on non-coding areas
- Includes appendices on “need to know” basis
- Makes the learning easier as organized by software development life cycle

This text is well suited for academic courses on Software Engineering or for conducting training programmes for software professionals. This book will be equally useful to the instructors of software engineering as well as busy professionals who wish to grasp the essentials of software engineering without attending a formal instructional course.

**CONTENTS:** Preface. Abbreviations. Software Engineering Backdrop. Software Development Orientation. Practices, Processes and Architecture. Software Project Management. Project Planning. Project Execution, Control and Closing. Software Requirements Phase. Software Design Phase. Object Oriented Analysis and Design. User Interface Development. Software Construction Phase. Quality Control. Appendices—A: Estimation Techniques. B: Quality and Quality Management Systems. C: Metrics and Measurements. D: Configuration Management. E: Process Modelling. F: Data Modelling. G: Time Frame Modelling. H: Object Orientation and UML. Bibliography.

Latest Print 2014 / 952 pp. / 17.8 x 23.5 cm

ISBN-978-81-203-3272-0 / ₹ 595.00



## COMPUTER SCIENCE AND ENGINEERING

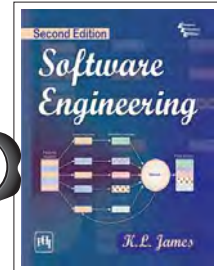
### Software Engineering

#### Software Engineering, 2nd ed.

**K.L. JAMES**, *Technical Officer, Computer Centre, University of Kerala, Trivandrum.*

The concepts, trends and practices in different phases of software development have taken sufficient advancement from the traditional ones. With these changes, methods of developing software, system architecture, software design, software coding, software maintenance and software project management have taken new shapes.

*Software Engineering* discusses the principles, methodologies, trends and practices associated with different phases of software engineering. Starting from the basics, the book progresses slowly to advanced and emerging topics on software project management, process models, developing methodologies, software specification, testing, quality control, deployment, software security, maintenance and software reuse. Case study is a special feature of this book that discusses real life situation of dealing with IT related problems and finding their practical solutions in an easy manner. Elegant and simple style of presentation makes reading of this book a pleasant experience. Students of Computer Science and Engineering, Information Technology and Computer Applications should find this book highly



useful. It would also be useful for IT technology professionals who are interested to get acquainted with the latest and the newest technologies.

#### NEW TO THIS EDITION

- Chapter-end exercises at the end of each chapter
- Exclusive Do it Yourself sections in all the chapters
- New Case Studies
- New topics on Vendor selection and management, Cloud computing development, Open source development, IDE, MIMO technology, and .NET

**CONTENTS:** Preface. An Introduction to Software Engineering. Software Project Management. Software Process Models. Software Development Approaches. Feasibility Factors and Software Metrics Estimation. Requirements Analysis and Software Requirements Specifications. Software Design. Software Coding. Software Testing. Software Quality. Software Deployment. Software Security. Software Reuse. Software Maintenance. CASE Tools. Index.

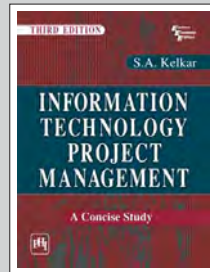
**Latest Print 2014 / 488 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-5004-5 / ₹ 425.00**



## COMPUTER SCIENCE AND ENGINEERING

### Software Project Management

#### Information Technology Project Management: A Concise Study, 3rd ed.



**S.A. KELKAR**, Former Adjunct Professor in the Department of Computer Science and Engineering, and the Shailesh J. Mehta School of Management, at the Indian Institute of Technology Bombay, Mumbai.

This book, in its third edition, is aimed at emphasizing the fundamental concepts associated with IT Project Management from a balanced perspective of theory and practice. By presenting the information in an abstracted form, this text guides the students through all phases of project life cycle, i.e. initiation, planning, execution, monitoring and control, and closure.

Besides such general management activities, this book comprehensively deals with all critical dimensions of project such as scope, time, cost, quality, human resources, communication, risk, procurement, and integrations in order to enhance the reader's understanding of technical competencies required in project management.

#### NEW TO THIS EDITION

Incorporates all the changes brought about in PMBOK 2008 (Fourth Edition) and ISO9000:2008

Though the basic structure of this book remains the same, several chapters have been modified and reorganized according to the latest trends

This book is well-suited for an academic course (one semester) on IT project management or for conducting an equivalent training programme for IT professionals. IT project managers, who are aspiring to get appropriate certification course based on PMBOK 2008 (Fourth Edition) from PMI, USA, will be greatly benefited by reading this book. Besides, this book will be equally useful for the software professionals who wish to grasp the essentials without attending a formal instructional course on the subject.

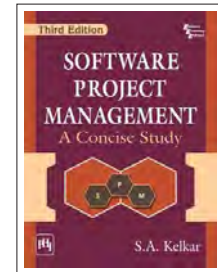
**CONTENTS:** Preface. Abbreviations. Project Management Backdrop. Quality and Quality Management Systems. Project Management Processes and PMIS. Pre-project Scenario. Project Initiation. Project Planning. Project Execution, Monitoring and Control. Project Closing and Beyond. Project Management Summary by Knowledge Areas. **Appendices**—A: IT Around Us. B: Capacity Planning. C: Software Development Orientation. D: Estimation Techniques. E: Quality Control. F: Metrics and Measurements. G: Configuration Management. H: Human Resources Management. I: Project Structure and Roles. Suggested Reading.



Latest Print 2012 / 864 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4273-6 / ₹ 525.00

PHI Learning: Publications

#### Software Project Management: A Concise Study, 3rd ed.



**S.A. KELKAR**, Former Adjunct Professor in the Department of Computer Science and Engineering, Shailesh J. Mehta School of Management, Indian Institute of Technology Bombay.

This well-established and highly appreciated book, now in its Third Edition, continues to build on the strength of the previous two editions.

While retaining many of the existing topics, Professor S.A. Kelkar, with his wealth of experience and expertise, gives an uptodate analysis of the subject, incorporating several new topics. The book is suffused with illustrations to reinforce the concepts discussed. As software project management is a core course in Computer Science and Engineering and Information Technology, and is a preferred choice of many management students, this book should be treasured by the readers, both for its utility and novelty of treatment.

Intended as a text for undergraduate and postgraduate students of Computer Science and Engineering and Information Technology, this concise and compact book would be extremely useful also to the postgraduate students of Computer Applications and postgraduate students of Management specializing in IT.

#### NEW TO THIS EDITION

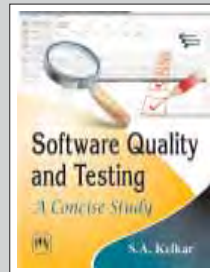
- Three Appendices on **Nutshell: Managing Complex Projects; Overview of IT Service Management; and Emotional Intelligence in Project Management** are included.
- Chapter 1 has been reorganized to make it more comprehensive.
- Chapter 2 has been split into three chapters (Chapters 2, 3 and 4). Each chapter deals with project management basics, planning, and control, emphasizing **stakeholder management, quality management, and earned management**.

**CONTENTS:** Preface. Preface to the First Edition. Abbreviations. Technical Development of Software. Software Project Management Basics. Project Initiation, and Planning. Project Execution, Control, Closing and Beyond. Software Project Estimation. Software Quality Management. Software Configuration Management. Software Team Management. Role of User in Software Projects. Appendices—A: Metrics and Measurements. B: Nutshell: Managing Complex Projects. C: Overview of IT Service Management. D: Emotional Intelligence in Project Management. Further Readings.

Latest Print 2013 / 372 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4702-1 / ₹ 275.00



### Software Quality and Testing: A Concise Study



**S.A. KELKAR**, Former Adjunct Professor in the Department of Computer Science and Engineering, and the Shailesh J. Mehta School of Management, at the Indian Institute of Technology Bombay, Mumbai.

This book is aimed at emphasising the fundamental concepts associated with Software Quality and Software Testing from a balanced perspective of theory and practice. By presenting the information in an abstracted form, this text guides the readers through all aspects of developing quality software (across the entire development life cycle). The book is written around the strategy of error avoidance, error detection (and correction), and error tolerance (as a last resort).

This text is well suited for teaching an academic course as a part of the Computer Science and/or Information Technology and/or MCA curriculum, or for conducting an equivalent training programme for professionals.

#### KEY FEATURES

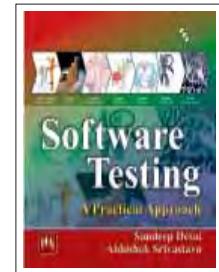
- Emphasises on management people issues in quality management
- Written in bullet point form
- Chapters follow the natural evolution of quality management

**CONTENTS:** Preface. Abbreviations. From Quality to Quality Management. Quality Assurance. Quality Control. Inspections, Reviews, and Walkthroughs. Software Testing. Levels of Testing. Testing Techniques. Debugging. Software Testing Tools. Quality and Auditing. Appendices—A: Software Development Orientation. B: Measurements and Software Metrics. C: Tools and Techniques for QC. D: QMS Models. Suggested Reading.



Latest Print 2012 / 624 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4628-4 / ₹ 475.00

### Software Testing: A Practical Approach



**SANDEEP DESAI**, Vice-President (Information Technology), AFCONS Infrastructure Limited, Mumbai. Currently, he is a senior Visiting Faculty at SNTD College, Mumbai.

**ABHISHEK SRIVASTAVA**, Software engineering, is a partner at TECHCANVASS.

This concise text provides an insight into practical aspects of software testing and discusses all the recent technological developments in this field including quality assurance. The book also illustrates the specific kinds of problems that software developers often encounter during development of software.

The book first builds up the basic concepts inherent in the software development life cycle (SDLC). It then elaborately discusses the methodologies of both static testing and dynamic testing of the software, covering the concepts of structured group examinations, control flow and data flow, unit testing, integration testing, system testing and acceptance testing. The text also focuses on the importance of the cost-benefit analysis of testing processes. The concepts of test automation, object-oriented applications, client-server and web-based applications have been covered in detail. Finally, the book brings out the underlying concepts of commercial off-the-shelf (COTS) software applications and describes the testing methodologies adopted in them.

The book is intended for the undergraduate and post-graduate students of computer science and engineering for a course in software testing.

#### KEY FEATURES

- Provides real-life examples, illustrative diagrams and tables to explain the concepts discussed.
- Gives a number of assignments drawn from practical experience to help the students in assimilating the concepts in a practical way.
- Includes model questions in addition to a large number of chapter-end review questions to enable the students to hone their skills and enhance their understanding of the subject matter.

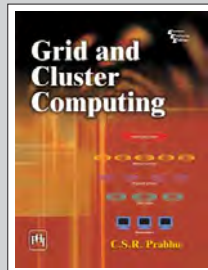
**CONTENTS:** Preface. Introduction. Software Development Life Cycle and Testing. Static Testing. Dynamic Testing. Test Management. Testing Tools. Object-oriented Testing. Testing Specialized Systems. Testing Cots. Model Papers. Glossary. Index.

Latest Print 2012 / 192 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4534-8 / ₹ 250.00



## Grid and Cluster Computing

**C.S.R. PRABHU**, Deputy  
Director General, National  
Informatics Centre (NIC),  
Hyderabad.



Grid Computing and Cluster Computing are advanced topics and latest trends in computer science that find a place in the computer science and information technology curricula of many engineering institutes and universities today. Divided into two parts—Part I, Grid Computing and Part II, Cluster Computing—, this compact and concise text strives to make the concepts of grid computing and cluster computing comprehensible to the students through its fine presentation and accessible style. Part I of the book enables the student not only to understand the concepts involved in grid computing but also to build their own grids for specific applications.

Similarly, as today supercomputers are being built using cluster computing architectures, Part II provides an insight into the basic principles involved in cluster computing and equips the readers with the knowledge to build their own clusters in-house.

Diagrams are used to illustrate the concepts discussed and to enable the reader to actually construct a grid or a cluster himself.

The book is intended as a text for undergraduate and postgraduate students of computer science and engineering, information technology (B.Tech./M.Tech. Computer Science and Engineering/IT), and postgraduate students of computer science/information technology (M.Sc. Computer Science and M.Sc. IT). Besides, practising engineers and computer science professionals should find the text very useful.

**CONTENTS:** Preface. Part I: Grid Computing—Introduction. Technologies and Architectures for Grid Computing. World Wide Grid Computing Activities, Organizations and Projects. Web Services and the Service Oriented Architecture (SOA). OGSA and WSRF. Globus Toolkit. The Grid and the Databases. Part II: Cluster Computing—What is Cluster Computing? Cluster Middleware: An Introduction. Early Cluster Architectures and High Throughput Computing Clusters. Networking, Protocols and I/O for Clusters. Setting Up and Administering a Cluster. Cluster Technology for High Availability. Performance Models and Simulation. Process Scheduling. Load Sharing and Load Balancing. Distributed Shared Memory. Case Studies of Cluster Systems: Beowulf, COMPaS, NanOS and PARAM. Index.

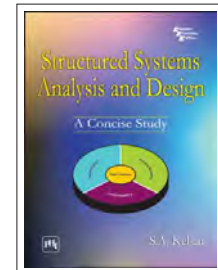
Latest Print 2014 / 256 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-3428-1 / ₹ 295.00



PHI Learning: Publications

## Structured Systems Analysis and Design: A Concise Study



**S.A. KELKAR**, Former Adjunct Professor, Department of  
Computer Science and Engineering as well as at the Shailesh J.  
Mehta School of Management, IIT Bombay.

Virtual presence of Internet and availability of information on the net have led to information systems becoming an inseparable part of organizations. Today, computer-based information systems are extensively used for acquisition, storage, and dissemination of data throughout the organizations. These information systems, however, need to be backed by sound software development activities. The systems analysts play a key role in development and implementation of the information systems in the organizations. It is, therefore, essential that they remain abreast of the latest software development methods and tools while using them.

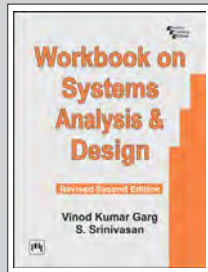
This concise book presents in an abstracted form, the essentials of theory and practice of structured systems analysis and design. It is aimed at getting the conceptual framework across to the readers and thus aiding in concept implementation. Well-suited for teaching an academic course of one semester in systems analysis and design, the text is also suitable for conducting short term training programmes for software professionals. Armed with these concepts and ideas, the systems analysts will be able to tackle various aspects of systems analysis and design in real life situations.

**CONTENTS:** Preface. SSAD: The Project Fit. Development Methodologies and CASE Tools. Systems Analysis. Requirements Strategies and Methods. Process Modeling. Logical DFDs. Data Modeling. Entity Life Histories. User Interface. Establish Requirements. Software Quality Assurance. System Design. Normal Form Analysis. System Partitioning. Program Design. Software Testing. Putting the Systems to Use. Suggested Reading.

Latest Print 2009 / 324 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-2451-0 / ₹ 225.00

### Workbook on Systems Analysis & Design, Revised 2nd ed.



**VINOD KUMAR GARG**, *Professor of Information Management at S.P. Jain Institute of Management and Research, Mumbai.*

**S. SRINIVASAN**, *Project Manager of Deloitte Consulting, Hyderabad.*

This second edition, provides step-by-step approach to the fundamentals of systems development in interactive hands-on and stimulating learning environment. It focuses on object-oriented analysis and design and approach to web application development. To enhance understanding of the subject, all the topics of the first edition have been reviewed and expanded.

The book first outlines the steps followed in analysis and design and then illustrates them with examples. The end-of-chapter practice exercises provide an incremental framework to reinforce the hands-on nature of learning.

It is useful for students and instructors as well as for the systems analysts and designers of IT companies to solve their day-to-day systems related problems.

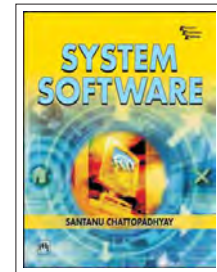
#### KEY FEATURES

- Provides hints on how to use techniques of SSAD in actual practice.
- Gives a comprehensive case study illustrating how the various application modeling tools could be applied in an integrated manner to a real life situation.
- Presents additional chapters on OOAD and web development.
- Supplies question bank with more than 50 carefully selected questions on various concepts.

**CONTENTS:** Preface. Acknowledgments. Chapter Summary. Introduction. Application Modeling. Database Design. Input-Output Design. Program Design. Case Study. Object-Oriented Analysis and Design. Question Bank. Appendix A—Structured Methodology Elements. Appendix B—Web Case Study. Glossary. Index.

**Latest Print 2009 / 252 pp. / 16.0 × 24.1 cm**  
**ISBN-978-81-203-1724-6 / ₹ 175.00**

### System Software



**SANTANU CHATTOPADHYAY**, *Professor with the Department of Electronics and Electrical Communication Engineering, Indian Institute of Technology Kharagpur.*

Intended as a text for the undergraduate students of **Computer Science** and Master of Computer Applications (MCA), this comprehensive yet concise book introduces the reader to the recent Intel 32-bit architecture, its programming and associated system programs. The text begins by giving an overview of major system software and proceeds to discuss the assembly language programming with a number of examples. Topics such as assemblers, linkers and **microprocessor** are dealt with using Netwide Assembler (NASM)—the free platform independent assembler to generate object code. All the stages of a compiler design, its important methodologies, and the recent design techniques of text editor along with the advance data structures used for this purpose are also covered in sufficient detail. Finally, the essential features of debuggers, their design techniques and, most importantly, the hardware and software support for designing a good debugger are described.

#### KEY FEATURES

- Gives a fairly large number of examples and problems to help students in understanding the concepts better.
- The text easily correlates theory with practice.
- Provides exhaustive discussion on Netwide Assembler (NASM).

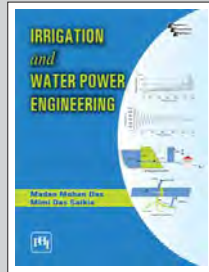
**CONTENTS:** Preface. Acknowledgments. Introduction. Assembly Language Programming. Assembler Design. Linker and Loader. Macroprocessor. Compiler. Text Editor. Debugger. Appendix: The Netwide Assembler: NASM. Bibliography. Index.

**Latest Print 2013 / 208 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-3051-1 / ₹ 195.00**

## ENGINEERING

**Agricultural (HYDROLOGY)**

### Irrigation and Water Power Engineering



**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.

Designed primarily as a textbook for the undergraduate students of civil and agricultural engineering, this comprehensive and well-written text covers irrigation system and hydroelectric power development in lucid language.

The text is organized in two parts. Part I (Irrigation Engineering) deals with the methods of water distribution to crops, water requirement of crops, soil-water relationship, well irrigation and hydraulics of well, canal irrigation and different theories of irrigation canal design. Part II (Water Power Engineering) offers the procedures of harnessing the hydropotential of river valleys to produce electricity. It also discusses different types of dams, surge tanks, turbines, draft tubes, power houses and their components. The text emphasizes on the solutions of unsteady equations of surge tank and pipe carrying water to power house under water hammer situation. It also includes computer programs for the numerical solutions of hyperbolic partial differential equations.

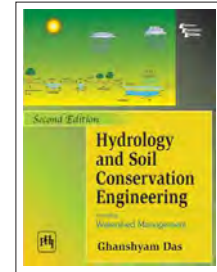
Besides undergraduate students, this book will also be of immense use to the postgraduate students of water resources engineering.

**CONTENTS:** Preface. Part I: Irrigation Engineering—Irrigation Engineering: An Introduction. Methods of Water Distribution to Crop Fields. Water Requirement of Crops and Soil Water Relationship. Well Hydraulics and Well Irrigation. Flow Irrigation. Canal Headworks. Cross Drainage Works. Canal Lining and Wasteland. Canal Fall. Design of Canal. Part II: Water Power Engineering—Water Power Engineering: An Introduction. Reservoirs. Dams: A General Introduction. Gravity Dam. Earth Dam and Arch Dam. Spillways. Intake Structures. Other Components of Water Power Plant. Unsteady Equations of Surge Tank: An Analysis. Water Hammer Pressure in Conduit Without a Surge Tank. Index.

 Latest Print 2014 / 436 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-3587-5 / ` 395.00

**Agricultural (SOIL CONSERVATION/HYDROLOGY)**

### Hydrology and Soil Conservation Engineering including Watershed Management, 2nd ed.



**GHANSHYAM DAS**, formerly Emeritus Fellow (AICTE) and Professor in Soil and Water Conservation Engineering, G.B. Pant University of Agriculture and Technology, Pantnagar.

Streamlined to facilitate student understanding, this second edition, containing the latest techniques and methodologies and some new problems, continues to provide a comprehensive treatment of hydrology of watersheds, soil erosion problems, design and installation of soil conservation practices and structures, hydrologic and sediment yield models, watershed management and water harvesting. It also deals with the special requirements of management of agricultural and forested watersheds.

This book is designed for undergraduate students of agricultural engineering for courses in hydrology, and soil and water conservation engineering. It will also be of considerable value to students of agriculture, soil science, forestry, and civil engineering.

#### FEATURES

- Emphasises fundamentals using numerous illustrations to help students visualise different phenomena
- Offers lucid presentation of field practices
- Presents the analysis and design of basic hydraulic structures
- Devotes an entire chapter to watershed management
- Provides numerous solved design problems and exercise problems to develop a clear understanding of the theory
- Gives theoretical questions, and objective type questions with answers to test the students' understanding.

**CONTENTS:** Preface. Introduction. Precipitation. Abstraction Losses. Stream Flow. Runoff. Frequency Analysis of Hydrologic Events. Hydrographs. Flood Routing. System, Conceptual and Dynamic Models of Runoff Hydrograph. Time Series Analysis. Soil Erosion. Controlling Soil Erosion. Water Harvesting. Watershed Management. Field Measurements: Runoff and Sediment Discharge. Appendices. Index.

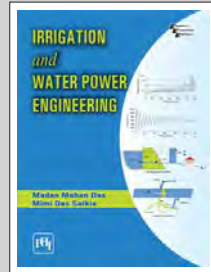
Latest Print 2014 / 552 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3586-8 / ` 425.00



## ENGINEERING

### Agricultural (WATER RESOURCE MANAGEMENT)

#### Irrigation and Water Power Engineering



**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.

Designed primarily as a textbook for the undergraduate students of civil and agricultural engineering, this comprehensive and well-written text covers irrigation system and hydroelectric power development in lucid language.

The text is organized in two parts. Part I (Irrigation Engineering) deals with the methods of water distribution to crops, water requirement of crops, soil-water relationship, well irrigation and hydraulics of well, canal irrigation and different theories of irrigation canal design. Part II (Water Power Engineering) offers the procedures of harnessing the hydropotential of river valleys to produce electricity. It also discusses different types of dams, surge tanks, turbines, draft tubes, power houses and their components. The text emphasizes on the solutions of unsteady equations of surge tank and pipe carrying water to power house under water hammer situation. It also includes computer programs for the numerical solutions of hyperbolic partial differential equations.

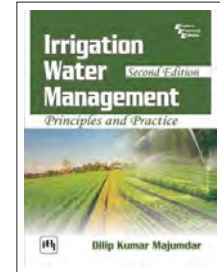
Besides undergraduate students, this book will also be of immense use to the postgraduate students of water resources engineering.

**CONTENTS:** Preface. Part I: Irrigation Engineering—Irrigation Engineering: An Introduction. Methods of Water Distribution to Crop Fields. Water Requirement of Crops and Soil Water Relationship. Well Hydraulics and Well Irrigation. Flow Irrigation. Canal Headworks. Cross Drainage Works. Canal Lining and Wasteland. Canal Fall. Design of Canal. Part II: Water Power Engineering—Water Power Engineering: An Introduction. Reservoirs. Dams: A General Introduction. Gravity Dam. Earth Dam and Arch Dam. Spillways. Intake Structures. Other Components of Water Power Plant. Unsteady Equations of Surge Tank: An Analysis. Water Hammer Pressure in Conduit Without a Surge Tank. Index.



Latest Print 2014 / 436 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-3587-5 / ₹ 395.00

#### Irrigation Water Management: Principles and Practice, 2nd ed.



**DILIP KUMAR MAJUMDAR**, formerly Professor of Agronomy and Principal (Dean), Institute of Agriculture, Visva-Bharati University, Santiniketan.

The book, now in its second edition, fulfills the need for an up-to-date comprehensive text on irrigation water management for students of agriculture both at the undergraduate and postgraduate levels. The scope of the book makes it a useful reference for courses in agricultural engineering, agronomy, soil science, agricultural physics and environmental sciences. It can also serve as a valuable guidebook to persons working with farming communities.

The coverage in sixteen chapters brings out different aspects of irrigation including irrigation situation in the world, rainfall, evaporation, water wealth and progressive development of irrigation in India, measurement of soil water and irrigation water, methods of irrigation, irrigation with saline water, formulating cropping pattern in irrigated area and management of high water table.

In the second edition, a new chapter on 'On-farm Irrigation System' has been included and a few chapters have been updated to include latest development.

The book has useful research data and a large number of diagrams for easy comprehension of the topics. The end-of-chapter problems and numerous worked-out examples serve to aid further understanding of the subject. The book also contains an extensive glossary.

**CONTENTS:** Preface. General. Water Wealth and Irrigation in India. Soil-Water Relationship. Soil Water Measurement. Soil Water-Plant Relationship. Estimating Water Requirement of Crops. Methods of Irrigation. Measurement of Water. Irrigation Efficiency. Scheduling Irrigation. Irrigation Practices in Crops. Quality of Water and Irrigation with Saline Water. Irrigation and Cropping Pattern. Irrigation and Fertilizer Use. Water Management in High Water Table Areas. On-farm Irrigation System. Appendices. Glossary. Subject Index.

Latest Print 2014 / 572 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-4826-4 / ₹ 450.00



## Medical Image Processing: Concepts and Applications

**G.R. SINHA**, Professor in Electronics and Telecommunication and Associate Director, Faculty of Engineering and Technology, Shri Shankaracharya Group of Institutions, Shri Shankaracharya Technical Campus, Bhilai, Chhattisgarh. He is Dean of Faculty and Executive Council Member, Swami Vivekanand Technical University, Bhilai, Chhattisgarh.

**BHAGWATI CHARAN PATEL**, Associate Professor in Information Technology, Faculty of Engineering and Technology, Shri Shankaracharya Group of Institutions, Shri Shankaracharya Technical Campus, Bhilai, Chhattisgarh.

*Medical Image Processing: Concepts and Applications* presents an overview of image processing for various applications in the field of medical science. Inclusion of several topics like noise reduction filters, feature extraction, image restoration, segmentation, soft computing techniques and context-based medical image retrieval, etc. makes this book a single-source information meeting the requirements of the readers. Besides, the coverage of digital image processing, human visual perception and CAD system to be used in automated diagnosis system, medical imaging modalities, various application areas of medical field, detection and classification of various disease, etc. is highly emphasised in the book.

The book, divided into eight chapters, presents the topics in a clear, simple, practical and cogent fashion that provides the students with the insight into theory as well as applications to the practical problems. The research orientation of the book greatly supports the concepts of image processing to be applied for segmentation, classification and detection of affected areas in X-ray, MRI and mammographic and all other medical images. Throughout the book, an attempt has been made to address the challenges faced by radiologists, physicians and doctors in scanning, interpretation and

diagnosis process. The book uses an abundance of colour images to impart a high level of comprehension of concepts and helps in mastering the process of medical image processing. Special attention is made on the review of algorithms or methods of medical image formation, processing and analysis, medical imaging applications, and emerging medical imaging modality.

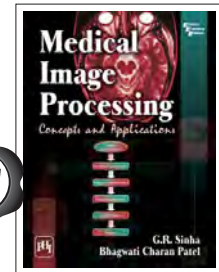
This is purely a text dedicated for the undergraduate and postgraduate students of biomedical engineering. The book is also of immense use to the students of computer science engineering and IT who offer a course on digital image processing.

### KEY POINTS

- Chapter-end review questions test the students' knowledge of the fundamental concepts.
- Course outcomes help the students in capturing the key points.
- Several images and information regarding morphological operations given in appendices help in getting additional knowledge in the field of medical image processing.

**CONTENTS:** Preface. Acknowledgements. Introduction. Biomedical Image Processing. Noise Reduction Filters for Medical Images. Feature Extraction and Statistical Measurement. Medical Image Restoration. Biomedical Image Segmentation. Soft Computing Techniques. Content-Based Medical Image Retrieval. Appendix A: SSGI Databases. Appendix B: Morphological Operations Used in Medical Image Processing. Index.

Latest Print 2014 / 280 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4902-5 / ₹ 495.00

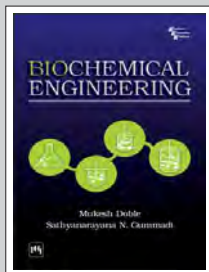




## ENGINEERING

Chemical (BIOCHEMICAL)

### Biochemical Engineering



**MUKESH DOBLE**, Professor, Department of Biotechnology, IIT Madras.

**SATHYANARAYANA N. GUMMADI**, Assistant Professor, Department of Biotechnology, IIT Madras.

This text is intended to provide students with a solid grounding in basic principles of biochemical engineering. Beginning with a historical review and essential concepts of biochemical engineering in part I, the next three parts are devoted to a comprehensive discussion of various topics in the areas of life sciences, kinetics of biological reactions and engineering principles.

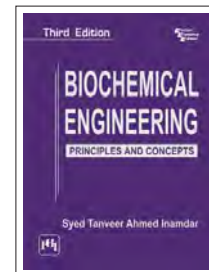
Having described the different building blocks of life, microbes, metabolism and bioenergetics, the book proceeds to explain enzymatic kinetics and kinetics of cell growth and product formation. The engineering principles cover transport phenomena in bioprocess systems and various bioreactors, downstream processing and environmental technology. Finally, the book concludes with an introduction to recombinant DNA technology.

This textbook is designed for B.Tech. courses in biotechnology, B.Tech. courses in chemical engineering and other allied disciplines, and M.Sc. courses in biotechnology.

**CONTENTS:** Preface. Part I: Introduction—Introduction to Biochemical Engineering. Part II: Essential Life Science—Biomolecules. Microbial World. Metabolism and Bioenergetics. Functions of Cell. Part III: Kinetics of Biological Reactions—Kinetics of Enzymatic Reactions. Cell Growth and Product Formation. Part IV: Engineering Principles—Transport Phenomena in Bioprocess Systems. Bioreactors and Scale-up. Downstream Processing. Environmental Technology. Recombinant DNA Technology. Bibliography. Index.

Latest Print 2007 / 236 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-3052-8 / ₹ 195.00

### Biochemical Engineering: Principles and Concepts, 3rd ed.



**SYED TANVEER AHMED INAMDAR**, Assistant Professor in the Department of Chemical Engineering, SDM College of Engineering and Technology, Dharwad, Karnataka.

The book, now in its Third Edition, continues to offer the basic concepts and principles of biochemical engineering. It covers the curriculum for a first-course in Biochemical Engineering at the undergraduate level of Chemical Engineering discipline and also caters to the requirements of BTech Biotechnology and BSc Biotechnology offered by various universities.

The text first explains the basics of microbiology and biochemistry before moving on to explore the significance of enzymes, their properties, types, kinetics, industrial applications, production and formulation and the methods of their immobilization. It also deals with cell growth and its kinetic aspects and discusses various types of biological reactors with an emphasis on key engineering practices related to fermentation processes and products, bioreactor design and operation. It offers a complete description on downstream processing and control of microorganisms. Besides, it also covers in the appendices some important topics such as process kinetics and reactor analysis, bioenergetics, and environmental microbiology to justify their relevance in biochemical engineering.

#### NEW TO THIS EDITION

- Offers a complete description with applications and configurations of membrane bioreactors (Chapter 7).
- Presents a facelift of downstream processes in the topics, viz. disruption of cells supported with flow sheet, freeze drying, formulation, etc. along with a total revamping of the discussion on supercritical fluid extraction and induction of biofouling (Chapter 9).
- Provides a new appendix—Appendix D—on Self-Assessment Exercises, which incorporates questions in the form of multiple choice, true/false and fill in the blanks in order to assess the level of understanding.

**CONTENTS:** Foreword. Preface. Preface to the First Edition. Biochemical Engineering: A Perspective. Microbiology Fundamentals. Biological Polymers. Enzymes and Enzyme Kinetics. Industrial Enzymes and Applications. Immobilized-enzyme Technology. Biomass Production In Cell Cultures. Biological Reactors. Fermentation Technology—Traditional Processes and Products. Downstream Processing. The Control of Microorganisms. Appendices—A: Process Kinetics and Reactor Analysis. B: Bioenergetics. C: Concepts In Environmental Microbiology. D: Self-assessment Exercises. Glossary. Bibliography. Index.

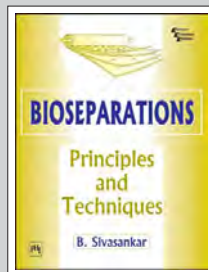
Latest Print 2012 / 468 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-4585-0 / ₹ 375.00



## ENGINEERING

### Chemical (BIOCHEMICAL)

#### Bioseparations: Principles and Techniques



**B. SIVASANKAR**, Professor, Department of Chemistry, Anna University, Chennai.

This systematically organized and well-balanced book compresses within the covers of a single volume the theoretical principles and techniques involved in bio-separations, also called downstream processing. These techniques are derived from a range of subjects, for example, physical chemistry, analytical chemistry, biochemistry, biological science and chemical engineering.


Organized in its 15 chapters, the text covers in the first few chapters topics related to chemical engineering unit operations such as filtration, centrifugation, adsorption, extraction and membrane separation as applied to bioseparations. The use of chromatography as practiced at laboratory as well as industrial scale operation and related techniques such as gel filtration, affinity and pseudoaffinity chromatography, ion-exchange chromatography, electrophoresis and related methods have been discussed. The important applications of these techniques have also been highlighted.

#### DISTINGUISHING FEATURES

- Basic principles involved in the various techniques are dealt with illustrative diagrams and description.
- Worked examples are given at the end of relevant chapters.
- An overview of entire course/subject of bioseparations is presented in Chapter 1.

The book is intended primarily as a textbook for undergraduate and postgraduate students of biotechnology—both in science and engineering. Some of the topics covered would also greatly benefit students who wish to specialize on certain areas as well as those in the industry engaged in biotechnology research.

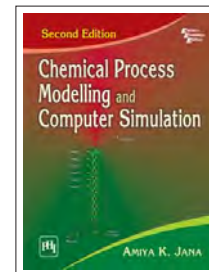
**CONTENTS:** Preface. An Overview of Bioseparations. Cell Disruption. Filtration. Centrifugation. Adsorption. Extraction. Membrane Separation Processes. Precipitation. Chromatography: Principles and Practice. Gel Filtration. Ion Exchange Chromatography and Chromatofocusing. Reversed Phase and Hydrophobic Interaction Chromatography. Affinity Chromatography. Electrokinetic Methods of Separation. Finishing Operations and Formulation. Bibliography. Index.

 Latest Print 2014 / 280 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-2649-1 / ₹ 275.00

PHI Learning: Publications

### Chemical (CHEMICAL PROCESS CONTROL)

#### Chemical Process Modelling and Computer Simulation, 2nd ed.



**AMIYA K. JANA**, Assistant Professor at IIT Kharagpur.

This comprehensive and thoroughly revised text, now in its second edition, continues to present the fundamental concepts of how mathematical models of chemical processes are constructed and demonstrate their applications to the simulation of two of the very important chemical engineering systems: the chemical reactors and distillation systems.


The book provides an integrated treatment of process description, mathematical modelling and dynamic simulation of realistic problems, using the robust process model approach and its simulation with efficient numerical techniques. Theoretical background materials on activity coefficient models, equation of state models, reaction kinetics, and numerical solution techniques—needed for the development of mathematical models—are also addressed in the book.

The topics of discussion related to tanks, heat exchangers, chemical reactors (both continuous and batch), biochemical reactors (continuous and fed-batch), distillation columns (continuous and batch), equilibrium flash vaporizer, and refinery debutanizer column contain several worked-out examples and case studies to teach students how chemical processes can be measured and monitored using computer programming.

The new edition includes two more chapters—Reactive Distillation Column and Vaporizing Exchangers—which will further strengthen the text.

This book is designed for senior level undergraduate and first-year postgraduate level courses in “Chemical Process Modelling and Simulation”. The book will also be useful for students of petrochemical engineering, biotechnology, and biochemical engineering. It can serve as a guide for research scientists and practising engineers as well.

**CONTENTS:** Preface. Part I: Introduction—Introduction to Modelling and Simulation. Numerical Methods. Part II: Reactor—Batch Reactor. Continuous Stirred Tank Reactor. Bioreactor. Part III: Distillation—Compartmental Distillation Model. Ideal Binary Distillation Column. Activity Coefficient Models. Binary Batch Distillation Column. Binary Continuous Distillation Column. Multicomponent Batch Distillation Column. Equilibrium Flash Vaporization. Equation of State Models. Refinery Debutanizer Column. Reactive Distillation Column. Part IV: Vaporizing Processes—Vaporizing Exchangers. Index.

 Latest Print 2014 / 376 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4477-8 / ₹ 350.00

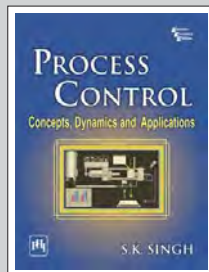


## ENGINEERING

**Chemical** (CHEMICAL PROCESS CONTROL)

### 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 2012 / 748 pp. / 17.8 × 23.5 cm

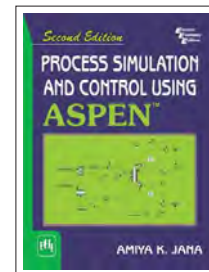
ISBN-978-81-203-3678-0 / 450.00



**Chemical** (CHEMICAL PROCESS MODELLING & SIMULATION)

### Process Simulation and Control Using ASPEN™, 2nd ed.

**AMIYA K. JANA**, Assistant Professor at IIT Kharagpur.



Solving the model structure with a large equation set becomes a challenging task due to the involvement of several complex processes in an industrial plant. To overcome these challenges, various process flow sheet simulators are used.

This book, now in its second edition, continues to discuss the simulation, optimization, dynamics and closed-loop control of a wide variety of chemical processes using the most popular commercial flow sheet simulator ASPEN™. A large variety of chemical units including flash drum, continuous stirred tank reactor, plug flow reactor, petroleum refining column, heat exchanger, absorption tower, reactive distillation, distillation train, and monomer production unit are thoroughly explained. The book acquaints the students with the simulation of large chemical plants with several single process units. With the addition of the new sections, additional information and plenty of illustrations and exercises, this text should prove extremely useful for the students.

Designed for the students of chemical engineering at the senior undergraduate and postgraduate level, this book will also be helpful to research scientists and practising engineers as a handy guide to simulation of chemical processes.

#### NEW TO THIS EDITION

- Section 1.3 on *Stepwise Aspen Plus Simulation of Flash Drums* is thoroughly updated (Chapter 1)
- Section 3.2 on *Aspen Plus Simulation of the Binary Distillation Columns* is updated, a new section on *Simulation of a Reactive Distillation Column* is added (Section 3.6), and a new topic on *Column Sizing* is introduced (Chapter 3)
- A new section on *Aspen Simulation of a Petlyuk Column with Streams Recycling* is included (Chapter 4)

**CONTENTS:** Preface. Preface to the First Edition. Acknowledgements. Part I: Steady State Simulation and Optimization using Aspen Plus™—Introduction and Stepwise Aspen Plus™ Simulation: Simple Examples. Aspen Plus™ Simulation of Reactor Models. Aspen Plus™ Simulation of Distillation Models. Part II: Chemical Plants Simulation using Aspen Plus™—Aspen Plus™ Simulation of Chemical Plants. Part III: Dynamics and Control using Aspen Dynamics™—Dynamics and Control of Flow-driven Processes. Dynamics and Control of Pressure-driven Processes. Index.

Latest Print 2014 / 376 pp. / 17.8 × 23.5 cm

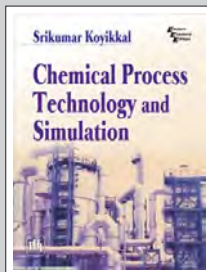
ISBN-978-81-203-4568-3 / 350.00



## ENGINEERING

### Chemical (CHEMICAL PROCESS TECHNOLOGY)

#### Chemical Process Technology and Simulation



**SRIKUMAR KOYIKKAL**, a graduate in Chemical Engineering and a postgraduate in 'Chemical Project Engineering' and with 40 years of industrial experience in process design, is currently working as a Process Design Consultant to chemical industries.

This book is designed to apprise the students of chemical engineering with the process descriptions of chemical technologies with the help of simplified flow sheets. Newer technologies have been added and some technologies which have lost their relevance have been omitted. Computer simulation methods have been described for many important technologies. In short, the book considers computer design tools and design software, in a manner that fits in smoothly into the main subject. The book is expected to become useful not only to students but also to practicing engineers and process designers.

There are chapters on natural products and fermentation process chemicals, organic chemicals, inorganic chemicals, refinery operations, oil and gas operations and nano-technology products. In some of them computer simulation and costing examples are included. Computerisation by process simulation is included in this book. An example of modelling and simulation using C++ is also given as an example of 'user written' programs for simulation. A third method that can be used for simulation is the use of spreadsheets which is also described with the help of an example. Chapters on refinery and oil and gas processes are suited to the present situation. A new important topic of today being 'polysilicon' used in the manufacture of computer chips and solar panels, is also covered in detail.

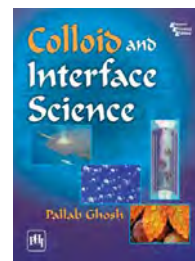
**CONTENTS:** Preface. Introduction. Natural and Bio-process Chemicals. Organic Chemicals. Inorganic Chemicals. Refinery Operations. Oil and Gas Operations. Nano-Technology Products. Modelling and Simulation. User-written Program Example. Cost Estimation Examples. Tables and Charts. References. Index.

Latest Print 2013 / 352 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4709-0 / ₹ 395.00



### Chemical (COLLOIDS)

#### Colloid and Interface Science



**PALLAB GHOSH**, Associate Professor, Department of Chemical Engineering, Indian Institute of Technology Guwahati.

The applications of colloids and interfaces are ubiquitous in human civilization. Beginning with edibles and personal hygiene products, the applications of colloid and interface science are visible in large-scale industrial undertakings such as petroleum recovery, manufacture of heavy chemicals and coating processes. In recent times, it has grown into a multidisciplinary subject meant for study by the chemical engineers, biotechnologists, chemists, physicists and environmental scientists.

This book provides a thorough understanding of the fundamental concepts and applications of colloid and interface science. It deals with the colloid chemistry and interfacial phenomena at both fluid-fluid and solid-fluid interfaces. The emerging areas of colloid and interface science such as nanomaterials and nanotechnology have also been discussed.

The book is designed as a textbook for B.Tech. students of chemical engineering. Besides, it would also be useful to the students of biotechnology, chemistry, chemical engineering, food science, physics and environmental science, scientists and engineers working in this field will also find this book useful.

Explained with a large number of figures and solved problems, and with the aid of many unsolved problems, this text should prove to be very helpful for understanding the subject.

**CONTENTS:** Preface. SI Units. Basic Concepts of Colloids and Interfaces. Properties of Colloid Dispersions. Surfactants and their Properties. Surface and Interfacial Tension. Intermolecular and Surface Forces. Adsorption at Interfaces. Interfacial Rheology. Monolayers and Thin Liquid Films. Emulsions, Microemulsions and Foams. Biological Interfaces. Nanomaterials. Interfacial Reactions. Index.

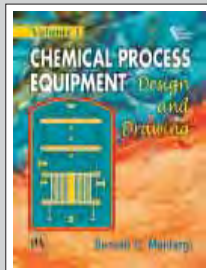
Latest Print 2009 / 520 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3857-9 / ₹ 425.00



## ENGINEERING

**Chemical (ENGINEERING DRAWING)**

### Chemical Process Equipment: Design and Drawing, Vol. I



**SURESH C. MAIDARGI**, Professor of Chemical Engineering at Dayananda Sagar College of Engineering, Bangalore.

This text introduces the students to the practices and standards of making drawings for equipment in chemical industries. The textbook follows the Bureau of Indian Standards (BIS) 696–1972 specifications and methodology of equipment drawings. It uses the symbolic representations of the equipment as used in the industry and provides the detailed drawings of some commonly used equipment. It includes numerous orthographic and assembled views of equipment, and provides several photographs to relate these drawings to equipment used in industries. Finally, the book includes several assignments to reinforce the concepts discussed in the text.

The text is intended for the undergraduate students of chemical engineering and its related branches such as polymer engineering, petroleum engineering, and pipeline engineering.

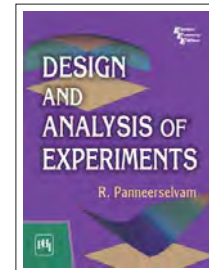
**CONTENTS:** Foreword. Preface. Introduction. Essentials of Drawing. Equipment Symbols. Proportionate Drawings of Some Parts of Equipment. Proportionate Drawings of Some Common Equipment. Dimensioned Drawings of Some Fittings. Dimensioned Drawings of Some Pipe Fittings. Dimensioned Drawings of Some Valves. Dimensioned Drawings of Some Pumps. Introduction to Computer Aided Design and Drawing. Bibliography. Index.



Latest Print 2012 / 152 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4496-9 / ₹ 175.00

**Chemical (EXPERIMENTAL DESIGN AND ANALYSIS)**

### Design and Analysis of Experiments (with CD-ROM)



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

Designed primarily as a text for the undergraduate and postgraduate students of industrial engineering, chemical engineering, production engineering, mechanical engineering, and quality engineering and management, it covers fundamentals as well as advanced concepts of Design of Experiments. The text is written in a way that helps students to independently design industrial experiments and to analyze for the inferences.

Written in an easy-to-read style, it discusses different experimental design techniques such as completely randomized design, randomized complete block design and Latin square design. Besides this, the book also covers 22, 23, and 3n factorial experiments; two-stage, three-stage and mixed design with nested factors and factorial factors; different methods of orthogonal array design; and multivariate analysis of variance (MANOVA) for one-way MANOVA and factorial MANOVA.

#### KEY FEATURES

- Case Studies to illustrate the concepts and techniques
- Chapter end questions on prototype reality problems
- Yates algorithm for 2n factorial experiments
- Answers to Selected Questions

**CONTENTS:** Preface. Introduction. Motivation for Using Analysis of Variance. Simple Designs of Anova. Complete Factorial Experiment. Experimental Designs with at Least One Random Factor. Nested Design. Confounded Design. Fractional Factorial Design. Split Plot Design. Regression Approach. Response Surface Methodology. Orthogonal Arrays. Robust Parameter Design. Grey Relational Analysis. Multivariate Analysis of Variance (Manova). Appendices. References. Answers to Selected Questions. Index.

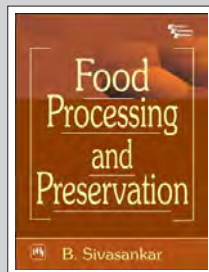
Latest Print 2012 / 576 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4499-0 / ₹ 450.00



## ENGINEERING

### Chemical (FOOD TECHNOLOGY)

#### Food Processing and Preservation



**B. SIVASANKAR**, Professor at Department of Chemistry, Anna University, Chennai.

Food science and technology is an interdisciplinary subject involving topics from chemistry, microbiology, chemical engineering and process technology. These topics need an interactive approach in order to comprehend the complexities involved in food processing and preservation. This book provides a thorough understanding of all major aspects of food processing with an emphasis on the microorganisms associated with food, before going into the problems of large-scale production and preservation of foodstuffs.

Written in a style that is student-friendly, the text introduces the important aspects of food science, such as functional role of the nutrients, the changes that the nutrients undergo during processing and preservation, and the chemical reactions responsible for spoiling various food materials as well as maintaining the organoleptic properties of foods.

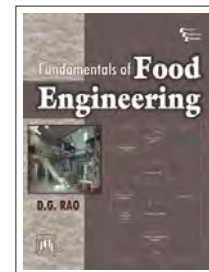
Intended as a textbook for undergraduate students of science and engineering, the study would also benefit the postgraduate students offering courses in food science as well as professionals and researchers.

**CONTENTS:** Preface. Introduction. Water. Carbohydrates. Lipids. Proteins and Enzymes. Vitamins and minerals. Food Colours and Flavours. Food Additives. Microorganisms Associated with Food. Fermented Foods and Food Chemicals. Food Borne Diseases. Food Spoilage. Food Engineering Operations. Food Conversion Operations. Food Preservation and Use of High Temperatures. Food Preservation by Evaporation and Drying. Low Temperature Food Processing and Preservation. Food Preservation by Irradiation and Allied Operations in Food Industry. Milk and Dairy Products. Vegetables and Fruits. Cereals, Legumes and Nuts. Meat and Meat Products. Fats and Oil. Beverages. Sugar, Sweetness, Honey and Confectionery. Salt and Spices. Food Quality. References. Index.



Latest Print 2014 / 372 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-2086-4 / ₹ 275.00

#### Fundamentals of Food Engineering



**D.G. RAO**, Scientist and Head,  
Central Food Technological  
Research Institute (CFTRI)  
Resource Centre, Hyderabad.

Food technology is the application of food science to the selection, preservation, processing, packaging, distribution and use of safe nutritious and wholesome food. The amalgamation of food technology with engineering operations has given birth to the discipline of food engineering.

Divided into four parts, the book begins with a brief introduction to food technology and its historical importance and development in the first part. The second part covers the basic principles, materials and energy balance concepts that prepare a solid ground for easy comprehension of the technology involved.

The third part, which deals with unit operations in food processing, is the core component of the book. It includes all the transport phenomena, mechanical operations, size reduction, grinding and milling. A separate chapter is devoted to microwave heating in view of its importance in food processing. Dehydration, solvent extraction, distillation, crystallization and mechanical operations have been discussed extensively. The fourth part deals with food industry management, and the peripheral and integrated food engineering operations.

The present textbook is designed for students of B.Tech (Food Technology/Food Engineering) and M.Sc (Food Technology). Besides, the students of Biochemical Engineering, Chemical Engineering and Biotechnology will find it immensely useful.

**CONTENTS:** Foreword. Preface. Part I: General Introduction—Introduction. Food Preservation Methods. Part II: Basic Engineering Principles—Basic Principles. Thermo Dynamics. Steam Generation and Utilization. Refrigeration. Humidity and Humidification. Measurement and Control of Process Parameters. Part III: Unit Operations—Fluid Mechanics. Rheology of Foods. Heat Transfer by Conduction. Heat Transfer by Convection. Heat Transfer Equipment. Heat Transfer by Radiation. Microwave Heating. Evaporation. Diffusion and Mass Transfer. Dehydration. Equilibrium: Stage Operations. Extraction. Crystallization. Filtration. Sedimentation and Centrifugation. Mixing. Size Reduction and Separation. Material Handling and Transportation. Part IV: Food Industry Management—Cleaning and Sanitation of Process Plants. Food Process Economics. Plant Design, Location and Equipment Layout. Appendices. Index.

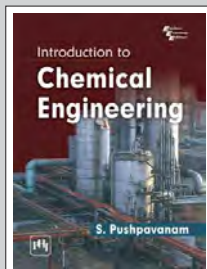
Latest Print 2012 / 704 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3871-5 / ₹ 425.00



## ENGINEERING

### Chemical (INTRODUCTION TO CHEMICAL ENGINEERING)

#### Introduction to Chemical Engineering



**S. PUSHPAVANAM** is the Head of the Department of Chemical Engineering at the Indian Institute of Technology Madras.

This book is an outgrowth of the author's teaching experience of a course on *Introduction to Chemical Engineering* to the first-year chemical engineering students of the Indian Institute of Technology Madras. The book serves to introduce the students to the role of a chemical engineer in society. In addition to the classical industries, the role of chemical engineers in several esoteric areas such as semiconductor processing and biomedical engineering is discussed. Besides highlighting the principles and processes of chemical engineering, the book shows how chemical engineering concepts from the basic sciences and economics are used to seek solutions to engineering problems.

The book is rich in examples of innovative solutions found to problems faced in chemical industry. It includes a wide spectrum of topics, selected from the industrial interactions of the author. It encourages the student to see the similarities in the concepts which govern apparently dissimilar examples. It introduces various concepts, using both physical and mathematical bases, to facilitate the understanding of difficult processes such as the scale-up process.

The book contains several case studies on safety, ethics and environmental issues in chemical process industries.

**CONTENTS:** Preface. Role of a Chemical Engineer. Modern Chemical Engineering Plants. Chemical Engineer and Chemical Engineering Profession. Role and Importance of Basic Sciences in Engineering. Dimensionless Analysis and Scaleup—Another Illustration of How Physics and Mathematics can be Combined. Semi-empirical Approach in Engineering—Departure from Scientific Rigor: Applications in Atmospheric Pollution and Turbulence. Safety, Health, Environment and Ethics. Appendix—MATLAB Programs. Index.

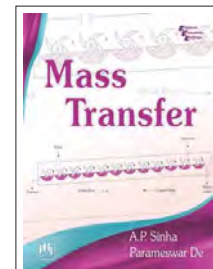
Latest Print 2012 / 184 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-4577-5 / ₹ 195.00



### Chemical (MASS TRANSFER)

#### 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

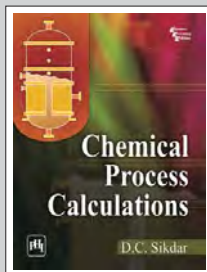
ISBN-978-81-203-4541-6 / ₹ 450.00



## ENGINEERING

### Chemical (MATERIAL AND ENERGY BALANCE)

#### Chemical Process Calculations



**D.C. SIKDAR**, Associate Professor, Department of Chemical Engineering, Dayananda Sagar College of Engineering, Bangalore.

Keeping the importance of basic tools of process calculations—material balance and energy balance—in mind, the text prepares the students to formulate material and energy balance theory on chemical process systems. It also demonstrates how to solve the main process-related problems that crop up in chemical engineering practice.

The chapters are organized in a way that enables the students to acquire an in-depth understanding of the subject. The emphasis is given to the units and conversions, basic concepts of calculations, material balance with/without chemical reactions, and combustion of fuels and energy balances. Apart from numerous illustrations, the book contains numerous solved problems, short questions and exercises which bridge the gap between theoretical learning and practical implementation. All the numerical problems are solved with block diagrams to reinforce the understanding of the concepts.

Primarily intended as a text for the undergraduate students of chemical engineering, it will also be useful for other allied branches of chemical engineering such as polymer science and engineering and petroleum engineering.

#### KEY FEATURES

- Methods of calculation for stoichiometric proportions with practical examples from the Industry
- Simplified method of solving numerical problems under material balance with and without chemical reactions
- Conversions of chemical engineering equations from one unit to another
- Solution of fuel and combustion, and energy balance problems using tabular column

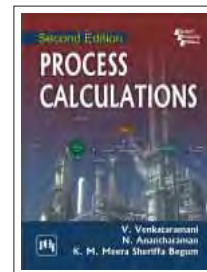
**CONTENTS:** Preface. Acknowledgements. Foreword. List of Symbols. Units and Dimensions. Basic Chemical Calculations. Material Balance Without Chemical Reactions. Material Balance With Chemical Reactions. Combustion of Fuels. Energy Balances. Index.

Latest Print 2013 / 352 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4782-3 / ₹ 350.00



#### Process Calculations, 2nd ed.



**V. VENKATARAMANI**, has been Professor in the Department of Chemical Engineering, National Institute of Technology, Tiruchirappalli.

**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.

This compact and highly readable text, now in its **second edition**, continues to provide a thorough introduction to the basic chemical engineering principles and calculations to enable the students to evaluate the material and energy balances in various units of a process plant. Unless a chemical engineer is conversant with the energy conservation techniques at every stage of the process, economy cannot be achieved in the design of process equipment.

The text lucidly explains the techniques involved in analyzing different chemical processes and the underlying theories by making a generous use of appropriate worked examples. The examples are simple and concrete to make the book useful for self-instruction.

In this new edition, besides worked examples, several exercises are included to aid students in testing their knowledge of the material contained in each chapter.

The book is primarily intended for undergraduate students of Chemical Engineering. It would also be useful to undergraduate students of Petroleum Technology, Pharmaceutical Technology and other allied branches of Chemical Engineering.

#### KEY FEATURES

- Exposes the reader to background information on different systems of units, dimensions and behaviour of gases, liquids and solids.
- Provides several examples with detailed solutions to explain the concepts discussed.
- Includes chapter-end exercises with answers to enhance learning.

**CONTENTS:** Preface. Preface to the First Edition. Acknowledgements. Units and Dimensions. Mass Relations. Ideal Gases. Vapour Pressure. Psychrometry. Crystallization. Mass Balance. Recycle and Bypass. Energy Balance. Problems On Unsteady State Operations. Tables. Answers to Exercises. Index.

Latest Print 2012 / 240 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-4199-9 / ₹ 195.00

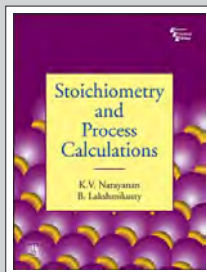




## ENGINEERING

### Chemical (MATERIAL AND ENERGY BALANCE)

#### Stoichiometry and Process Calculations



**K.V. NARAYANAN**, *Professor and Head, Department of Chemical Engineering, Government Engineering College, Thrissur.*

**B. LAKSHMIKUTTY**, *Professor, Department of Chemical Engineering, Government Engineering College, Thrissur.*

This textbook is designed for undergraduate courses in chemical engineering and related disciplines such as biotechnology, polymer technology, petrochemical engineering, electrochemical engineering, environmental engineering, safety engineering and industrial chemistry.

The chief objective of this text is to prepare students to make analysis of chemical processes through calculations and also to develop in them systematic problem-solving skills. The students are introduced not only to the application of law of combining proportions to chemical reactions (as the word 'stoichiometry' implies) but also to formulating and solving material and energy balances in processes with and without chemical reactions.

The book presents the fundamentals of chemical engineering operations and processes in an accessible style to help the students gain a thorough understanding of chemical process calculations. It also covers in detail the background materials such as units and conversions, dimensional analysis and dimensionless groups, property estimation, *P-V-T* behaviour of fluids, vapour pressure and phase equilibrium relationships, humidity and saturation.

With the help of examples, the book explains the construction and use of reference-substance plots, equilibrium diagrams, psychrometric charts, steam tables and enthalpy composition diagrams. It also elaborates on thermophysics and thermochemistry to acquaint the students with the thermodynamic principles of energy balance calculations.

**CONTENTS:** Preface. Introduction. Units and Dimensions. Fundamental Concepts of Stoichiometry. Ideal Gases and Gas Mixtures. Properties of Real Gases. Vapour Pressure. Solutions and Phase Behaviour. Humidity and Humidity Chart. Material Balance in Unit Operations. Material Balance with Chemical Reaction. Energy Balance: Thermophysics. Energy Balance: Thermochemistry. *Appendix: Tables of Properties. Objective Type Questions. Bibliography. Answers to Exercises.* Index.

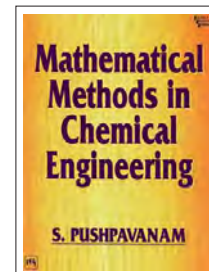
Latest Print 2014 / 604 pp. / 17.8 × 23.5 cm



ISBN-978-81-203-2992-8 / ₹ 395.00

### Chemical (MATHEMATICAL METHODS)

#### Mathematical Methods in Chemical Engineering



**S. PUSHPAVANAM**, *Associate Professor, Department of Chemical Engineering, Indian Institute of Technology Madras.*

This comprehensive, well organized and easy-to-read book presents concepts in a unified framework to establish a similarity in the methods of solutions and analysis of such diverse systems as algebraic equations, ordinary differential equations and partial differential equations. The distinguishing feature of the book is the clear focus on analytical methods of solving equations. The text explains how the methods meant to elucidate linear problems can be extended to analyse nonlinear problems. The book also discusses in detail modern concepts like bifurcation theory and chaos.

Intended as a textbook for the postgraduate students in engineering, the book could also be of great help to the research students.

**CONTENTS:** Preface. Models in Chemical Engineering. Vector and Vector Spaces. Matrices, Operators and Transformations. Applications to Chemical Engineering Systems. Partial Differential Equations. Sturm-Liouville Theory. Separation of Variables and Fourier Transforms. Green's Function. Uniqueness Conditions for Linear and Nonlinear Systems. Steady State Characteristics of Nonlinear Dynamical Systems. Linear Stability and Limit Cycles. Secondary Bifurcations and Chaos. Index.

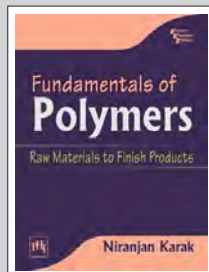
Latest Print 2012 / 336 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-1262-3 / ₹ 295.00

## ENGINEERING

### Chemical (POLYMER TECHNOLOGY)

#### Fundamentals of Polymers: Raw Materials to Finish Products



**NIRANJAN KARAK**, *Professor of Polymer Science and Technology in Chemical Sciences Department, Tezpur University.*

This systematically organized text gives a clear understanding of the basic concepts of polymer science and technology and presents the preparation, characterization, properties and applications of polymers.

The book discusses the raw materials for polymers, polymer forming processes and the various techniques of polymerization. It explains the modification of polymers and all types of additives used with polymers in their end applications. The book also describes the analytical, instrumental and spectroscopic techniques for testing and characterizing polymers, as well as covers the structures and properties of polymers along with their processing and applications. Thermoplastic and thermosetting polymers with a main focus on their manufacturing processes, structures and properties are also discussed. A comparative study of conventional linear polymers and advanced highly branched macromolecules has been included. Finally, a discussion on the basic idea and manufacturing process of some polymer-based industrial products adds value to this text.

#### KEY FEATURES

- Presents advanced topics such as dendritic polymers and polymer nanocomposites.
- Includes a number of illustrations to reinforce the understanding of the subject.
- Contains chapter-end exercises for practice.

This book is designed for the undergraduate and postgraduate students of chemical engineering, polymer science and technology, and rubber science and technology. It is also useful to postgraduate students of applied and industrial chemistry.

**CONTENTS:** Preface. Basic Concept. Materials and Methods. Modification and Additives for Polymers. Characterization and Analysis of Polymers. Structure and Property of Polymers. Processing and Applications. Thermoplastic Polymers. Thermosetting Polymers. Dendritic Polymers. Polymer Nano-composites. Product Manufacturing. References. Index.

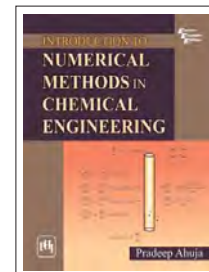


Latest Print 2009 / 304 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3877-7 / ₹ 275.00

PHI Learning: Publications

### Chemical (NUMERICAL METHODS)

#### Introduction to Numerical Methods in Chemical Engineering



**PRADEEP AHUJA**, *Associate Professor, Department of Chemical Engineering and Technology, Institute of Technology, Banaras Hindu University, Varanasi.*

This book is an exhaustive presentation of the numerical methods used in chemical engineering. Intended primarily as a textbook for BE/BTech students of chemical engineering, the book will also be useful to research and development/process professionals in the fields of chemical, biochemical, mechanical and biomedical engineering.

The initial chapters discuss the linear and nonlinear algebraic equations. The ensuing chapters cover the problems in chemical engineering thermodynamics as well as initial value problems, boundary value problems and convection-diffusion problems. Topics related to chemical reaction, dispersion and diffusion as well as steady and transient heat conduction are treated in the final chapters. The book covers a large number of numerical methods including tridiagonal matrix algorithm (TDMA) method, Newton's method, Runge-Kutta fourth-order method, Upwind Difference Scheme (UDS) method and Alternating Direction Implicit (ADI) method. Strong emphasis is given on applications and uses of numerical analysis specifically required at the undergraduate level.

The book contains numerous worked-out examples and chapter-end exercises. The answers to all chapter-end exercises are provided. The Appendix contains a total of 33 programs in C++ related to the various numerical methods explained in the book.

**CONTENTS:** Preface. Linear Algebraic Equations. Nonlinear Algebraic Equations. Chemical Engineering Thermodynamics. Initial Value Problems. Boundary Value Problems. Convection-Diffusion Problems. Tubular Reactor with Axial Dispersion. Chemical Reaction and Diffusion in Spherical Catalyst Pellet. One-Dimensional Transient Heat Conduction. Two-Dimensional Steady and Transient Heat Conduction. Appendix: Programs in C++. Bibliography. Index.

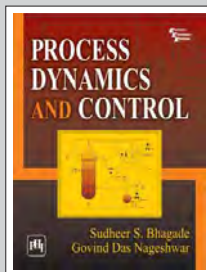
Latest Print 2010 / 304 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4018-3 / ₹ 275.00



## ENGINEERING

Chemical (PROCESS CONTROL)

### Process Dynamics and Control



**SUDHEER S. BHAGADE**, Professor, Department of Chemical Engineering, Anuradha Engineering College, Chikhli (Maharashtra).

**GOVIND DAS NAGESHWAR** has been former Director of Laxminarayan Institute of Technology, Nagpur (Maharashtra).

This well-organized and comprehensive book presents the basic concept and terminology of process control citing examples from day-to-day life. The text discusses the order of dynamic elements and their responses, transportation lag, block diagrams, final control elements, controllers, the concept of stability, techniques to tune controllers, etc. in detail. It also explains the way the elements are put together to form a loop and their interactions to each other, Ziegler-Nichols and Tyreus-Luyben controller settings, and a host of other topics that help students understand the control configuration.

Primarily intended for undergraduate students of chemical engineering, this text can also be useful for undergraduate students of electrical and mechanical engineering.

#### KEY FEATURES

- Provides examples of several dynamic elements from chemical industry.
- Includes a large number of diagrams illustrating the control action to be implemented.
- Gives examples of dynamic elements from chemical industry to correlate functioning of equipment from control point of view.
- Deals with both electronic and pneumatic controllers.

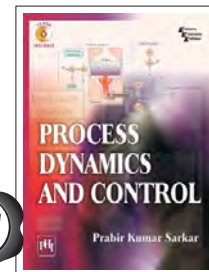
**CONTENTS:** Preface. What is Process Control? Order of Elements. Dynamics of First Order Elements. Dynamics of Higher Order Elements. Dynamics of Elements With Unusual Characteristics. Characteristics of Real Systems. Control Valves. Controllers. Control Loops. Closed Loop Response. Control Quality. Routh Test. Root Locus Diagrams. Frequency Response Technique. MIMO Systems. Compensation. Control Strategies. Sampled Data Systems. Index.



Latest Print 2011 / 352 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4405-1 / ₹ 350.00

Chemical (PROCESS DYNAMICS CONTROL)

### Process Dynamics and Control



**PRABIR KUMAR SARKAR** has been Reader, Chemical Engineering Department, Jadavpur University, Kolkata.



Primarily intended as a textbook for the undergraduate students of chemical engineering, it introduces students to fundamental principles in system dynamics and control. This book bridges the conceptual gap by using a number of examples from physical as well as from different facets of human experience.

The text introduces the concepts of State variable techniques and MIMO systems. An indigenously developed simulation platform for open and close loop simulation has been introduced for analysis and design of dynamic processes. All the topics in this text are supported by quite a number of worked out and exercise problems.

The Accompanying CD with this book includes a number of computer programs to verify the results obtained during the open and closed loop dynamic studies. The CD also contains a number of Demonstration Programs, which exposes many concepts of process dynamics and control through extensive use of animated graphics.

**CONTENTS:** Preface. Acknowledgements. Introduction. Preliminary Concepts for Process Dynamic Model Development. Basic Modelling Principles (Time Domain Analysis). Transfer Function of First Order Systems (Complex Domain Analysis). Response of First Order Systems (Complex Domain Analysis). Transfer Function Development and Response Analysis of Second Order Systems (Complex Domain Analysis). Measuring Elements, Signal Transducers and Final Control Elements. Automatic Controllers. Dynamic Model and Response Analysis of Closed Loop Systems. Stability Analysis of Closed Loop Systems. Frequency Response Analysis. Process Identification (Experimental Methods of Dynamic Model Development). Controller Tuning. Digital Simulation of Processes and Control Systems. Advanced Control Strategies. State Variables and Multiple Input-Output Systems. Appendices—**1A:** Common Unit Conversions and Physical Properties. **1B:** Instrument Symbols Used in This Book. **2:** Laplace' Transform. **3A:** Control Valves, Their Steady State Characteristics and Sizing. **3B:** Processes with Recycle Path. **4:** Transform Chart, Response Equations and Controller Tuning Formulae.

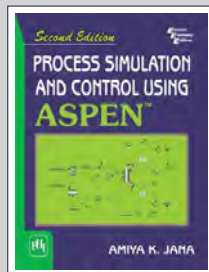
Latest Print 2014 / 784 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4846-2 / ₹ 695.00

## ENGINEERING

### Chemical (PROCESS CONTROL)

#### Process Simulation and Control Using ASPEN™, 2nd ed.

AMIYA K. JANA, Assistant Professor at IIT Kharagpur.



Solving the model structure with a large equation set becomes a challenging task due to the involvement of several complex processes in an industrial plant. To overcome these challenges, various process flow sheet simulators are used.

This book, now in its second edition, continues to discuss the simulation, optimization, dynamics and closed-loop control of a wide variety of chemical processes using the most popular commercial flow sheet simulator ASPEN™. A large variety of chemical units including flash drum, continuous stirred tank reactor, plug flow reactor, petroleum refining column, heat exchanger, absorption tower, reactive distillation, distillation train, and monomer production unit are thoroughly explained. The book acquaints the students with the simulation of large chemical plants with several single process units. With the addition of the new sections, additional information and plenty of illustrations and exercises, this text should prove extremely useful for the students.

Designed for the students of chemical engineering at the senior undergraduate and postgraduate level, this book will also be helpful to research scientists and practising engineers as a handy guide to simulation of chemical processes.

#### NEW TO THIS EDITION

- Section 1.3 on *Stepwise Aspen Plus Simulation of Flash Drums* is thoroughly updated (Chapter 1)
- Section 3.2 on *Aspen Plus Simulation of the Binary Distillation Columns* is updated, a new section on *Simulation of a Reactive Distillation Column* is added (Section 3.6), and a new topic on *Column Sizing* is introduced (Chapter 3)
- A new section on *Aspen Simulation of a Petlyuk Column with Streams Recycling* is included (Chapter 4)

**CONTENTS:** Preface. Preface to the First Edition. Acknowledgements. Part I: Steady State Simulation and Optimization using Aspen Plus™—Introduction and Stepwise Aspen Plus™ Simulation: Simple Examples. Aspen Plus™ Simulation of Reactor Models. Aspen Plus™ Simulation of Distillation Models. Part II: Chemical Plants Simulation using Aspen Plus™—Aspen Plus™ Simulation of Chemical Plants. Part III: Dynamics and Control using Aspen Dynamics™—Dynamics and Control of Flow-driven Processes. Dynamics and Control of Pressure-driven Processes. Index.



Latest Print 2014 / 376 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4568-3 / ₹ 350.00

PHI Learning: Publications

### Chemical (SEPARATION PROCESS)

#### Bioseparations: Principles and Techniques



B. SIVASANKAR, Professor, Department of Chemistry, Anna University, Chennai.

This systematically organized and well-balanced book compresses within the covers of a single volume the theoretical principles and techniques involved in bio-separations, also called downstream processing. These techniques are derived from a range of subjects, for example, physical chemistry, analytical chemistry, biochemistry, biological science and chemical engineering.

Organized in its 15 chapters, the text covers in the first few chapters topics related to chemical engineering unit operations such as filtration, centrifugation, adsorption, extraction and membrane separation as applied to bio-separations. The use of chromatography as practiced at laboratory as well as industrial scale operation and related techniques such as gel filtration, affinity and pseudoaffinity chromatography, ion-exchange chromatography, electrophoresis and related methods have been discussed. The important applications of these techniques have also been highlighted.

#### DISTINGUISHING FEATURES

- Basic principles involved in the various techniques are dealt with illustrative diagrams and description.
- Worked examples are given at the end of relevant chapters.
- An overview of entire course/subject of bio-separations is presented in Chapter 1.

The book is intended primarily as a textbook for undergraduate and postgraduate students of biotechnology—both in science and engineering. Some of the topics covered would also greatly benefit students who wish to specialize on certain areas as well as those in the industry engaged in biotechnology research.

**CONTENTS:** Preface. An Overview of Bioseparations. Cell Disruption. Filtration. Centrifugation. Adsorption. Extraction. Membrane Separation Processes. Precipitation. Chromatography: Principles and Practice. Gel Filtration. Ion Exchange Chromatography and Chromatofocusing. Reversed Phase and Hydrophobic Interaction Chromatography. Affinity Chromatography. Electrokinetic Methods of Separation. Finishing Operations and Formulation. Bibliography. Index.

Latest Print 2014 / 280 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-2649-1 / ₹ 275.00

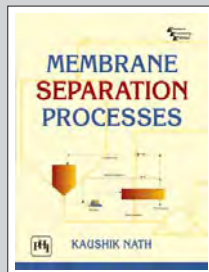


## ENGINEERING

### Chemical (SEPARATION PROCESS)

#### Membrane Separation Processes

**KAUSHIK NATH**, Assistant Professor and Head, Department of Chemical Engineering, G.H. Patel College of Engineering and Technology, Vallabh Vidyanagar, Gujarat.



This concise and systematically organized text gives a clear insight into various membrane separation processes, covering the fundamentals as well as the recent developments of different processes as well as their industrial applications and the products. It covers the basic principles, operating parameters, types of membrane used, flux equation, transport mechanism, and applications of membrane-based technologies.

Membrane separation processes are largely rate-controlled separations which require rate analysis for complete understanding. Moreover, a higher level of mathematical analysis, along with the understanding of mass transfer, is also required. These are amply treated in different chapters of the book to make the students comprehend the membrane separation principles with ease. The book has a sufficient number of examples and exercises, thus making it student friendly.

#### KEY FEATURES

- Provides sufficient numbers of examples of industrial applications related to chemical, metallurgical, biochemical and food processing industries.
- Focuses on important biomedical applications of membrane-based technologies such as blood oxygenator, controlled drug delivery, plasmapheresis, and bioartificial organs.
- Includes chapter-end short questions and problems to test students' comprehension of the subject.

This textbook is primarily designed for undergraduate students of chemical engineering, biochemical engineering and biotechnology for the course in membrane separation processes. Besides, the book will also be useful to process engineers and researchers.

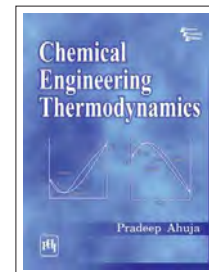
**CONTENTS:** Preface. Overview of Membrane Separation Processes. Membrane Types, Materials, Preparation and Characterization. Reverse Osmosis. Nanofiltration. Ultrafiltration. Microfiltration. Dialysis. Gas Separation. Pervaporation. Ion Exchange Membrane Process: Electrodialysis. Introduction to Liquid Membrane. Facilitated Transport. Other Membrane Processes. Biomedical Applications of Membranes. Appendix. References and Further Reading. Index.

Latest Print 2012 / 336 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-3532-5 / ₹ 295.00

### Chemical (THERMAL ENGINEERING)

#### Chemical Engineering Thermodynamics

**PRADEEP AHUJA**, Reader in the Department of Chemical Engineering and Technology, Institute of Technology, Banaras Hindu University, Varanasi.



This book offers a full account of thermodynamic systems in chemical engineering. It provides a solid understanding of the basic concepts of the laws of thermodynamics as well as their applications with a thorough discussion of phase and chemical reaction equilibria.

At the outset the text explains the various key terms of thermodynamics with suitable examples and then thoroughly deals with the virial and cubic equations of state by showing the  $P$ - $V$ - $T$  (pressure, molar volume and temperature) relation of fluids. It elaborates on the first and second laws of thermodynamics and their applications with the help of numerous engineering examples. The text further discusses the concepts of exergy, standard property changes of chemical reactions, thermodynamic property relations and fugacity. The book also includes detailed discussions on residual and excess properties of mixtures, various activity coefficient models, local composition models, and group contribution methods. In addition, the text focuses on vapour-liquid and other phase equilibrium calculations, and analyzes chemical reaction equilibria and adiabatic reaction temperature for systems with complete and incomplete conversion of reactants.

The book is primarily designed for the undergraduate students of chemical engineering and its related disciplines such as petroleum engineering and polymer engineering. It can also be useful to professionals.

The **Solution Manual** containing the complete worked-out solutions to chapter-end exercises and problems is available for instructors.

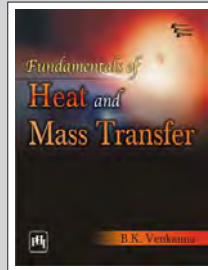
**CONTENTS:** Preface. Nomenclature. Introduction. Equations of State. The First Law and Its Applications. The Second Law and Its Applications. Exergy (Availability). Chemical Reactions. Thermodynamic Property Relations of Pure Substances. Thermodynamic Cycles. General Residual Property Relations. Residual Properties by Equations of State. Properties of a Component in a Mixture. Partial Molar Volume and Enthalpy from Experimental Data. Fugacity of a Component in a Mixture by Equations of State. Activity Coefficient Models of Liquid Mixtures. Vapour-Liquid Equilibrium. Other Phase Equilibria. Chemical Reaction Equilibria. Adiabatic Reaction Temperature. Appendix. Bibliography. Index.

Latest Print 2009 / 720 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3637-7 / ₹ 450.00

## ENGINEERING

### Chemical (THERMAL ENGINEERING)

#### Fundamentals of Heat and Mass Transfer



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

This comprehensive text on the basics of heat and mass transfer theory provides a solid introduction to 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 solving problems, this text is written to meet the needs of undergraduate students in mechanical engineering, production engineering, industrial engineering, automobile engineering, and aeronautical engineering.

#### KEY FEATURES

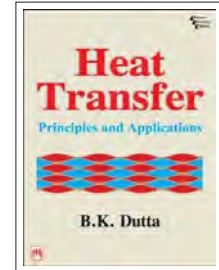
- Covers the theoretical material systematically and in a step-by-step approach.
- Focuses on problem-solving techniques.
- Provides an excellent selection of more than 300 graded solved examples to foster understanding of the theory.
- Gives over 100 chapter-end problems, useful for self-assessment
- 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 2010 / 508 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4031-2 / ₹ 395.00

#### Heat Transfer: Principles and Applications



**BINAY K. DUTTA**, *Professor in Chemical Engineering Department of Universiti Teknologi Petronas, Malaysia.*

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.

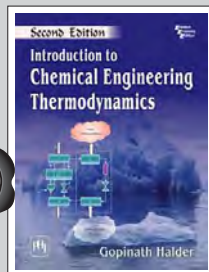
**CONTENTS:** Preface. Notations. Introduction. Steady State Conduction in One Dimension. Heat Transfer Coefficient. Forced Convection. Free Convection. Boiling and Condensation. Radiation Heat Transfer. Heat Exchangers. Evaporation and Evaporators. Unsteady State and Multidimensional Heat Conduction.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

Latest Print 2014 / 544 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-1625-6 / ₹ 350.00

## ENGINEERING

### Chemical (THERMAL ENGINEERING)

#### Introduction to Chemical Engineering Thermodynamics, 2nd ed.



**GOPINATH HALDER**, Associate Professor, Department of Chemical Engineering, National Institute of Technology, Durgapur, West Bengal.

This book, now in its second edition, continues to provide a comprehensive introduction to the principles of chemical engineering thermodynamics and also introduces the student to the application of principles to various practical areas.

The book emphasizes the role of the fundamental principles of thermodynamics in the derivation of significant relationships between the various thermodynamic properties. The initial chapter provides an overview of the basic concepts and processes, and discusses the important units and dimensions involved. The ensuing chapters, in a logical presentation, thoroughly cover the first and second laws of thermodynamics, the heat effects, the thermodynamic properties and their relations, refrigeration and liquefaction processes, and the equilibria between phases and in chemical reactions. The book is suitably illustrated with a large number of visuals.

In the second edition, new sections on Quasi-Static Process and Entropy Change in Reversible and Irreversible Processes are included. Besides, new Solved Model Question Paper and several new Multiple Choice Questions are also added that help develop the students' ability and confidence in the application of the underlying concepts.

Primarily intended for the undergraduate students of chemical engineering and other related engineering disciplines such as polymer, petroleum and pharmaceutical engineering, the book will also be useful for the postgraduate students of the subject as well as professionals in the relevant fields.

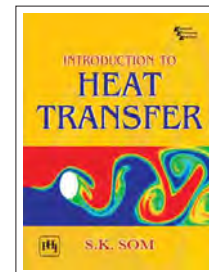
**CONTENTS:** Preface. Acknowledgements. Introduction and Basic Concepts. First Law of Thermodynamics. Properties of Pure Substances. Heat Effects. Second Law of Thermodynamics. Thermodynamic Property Relations. Application of Thermodynamics to Flow Processes. Refrigeration and Liquefaction Process. Solution Thermodynamics: Properties. Vapour-Liquid Equilibrium. Additional Topics in Phase Equilibrium. Chemical Reaction Equilibria. Appendixes—A: Property Tables. B: Solved Model Question Papers. C: Multiple Choice Questions. Bibliography. Index.



Latest Print 2014 / 684 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4897-4 / ₹ 495.00

#### Introduction to Heat Transfer

**S.K. SOM**, Professor in the department of mechanical engineering at the Indian Institute of Technology Kharagpur and currently the Dean of Academic Affairs (undergraduate studies).



This book presents a comprehensive treatment of the essential fundamentals of the topics that should be taught as the first-level course in Heat Transfer to the students of engineering disciplines. The book is designed to stimulate student learning through clear, concise language. The theoretical content is well balanced with the problem-solving methodology necessary for developing an orderly approach to solving a variety of engineering problems. The book provides adequate mathematical rigour to help students achieve a sound understanding of the physical processes involved.

#### KEY FEATURES

- A well-balanced coverage between analytical treatments, physical concepts and practical demonstrations.
- Analytical descriptions of theories pertaining to different modes of heat transfer by the application of conservation equations to control volume and also by the application of conservation equations in differential form like continuity equation, Navier-Stokes equations and energy equation.
- A short description of convective heat transfer based on physical understanding and practical applications without going into mathematical analyses (Chapter 5).
- A comprehensive description of the principles of convective heat transfer based on mathematical foundation of fluid mechanics with generalized analytical treatments (Chapters 6, 7 and 8).
- A separate chapter describing the basic mechanisms and principles of mass transfer showing the development of mathematical formulations and finding the solution of simple mass transfer problems.
- A summary at the end of each chapter to highlight key terminologies and concepts and important formulae developed in that chapter.
- A number of worked-out examples throughout the text, review questions, and exercise problems (with answers) at the end of each chapter.

This book is appropriate for a one-semester course in Heat Transfer for undergraduate engineering students pursuing careers in mechanical, metallurgical, aerospace and chemical disciplines.

**CONTENTS:** Preface. Fundamental Concepts. One-dimensional Steady-state Heat Conduction. Multi-dimensional Steady-state Heat Conduction. Unsteady Conduction. Convection. Incompressible Viscous Flow: A Brief Review. 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. Appendixes. Index.

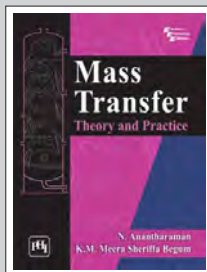
Latest Print 2013 / 572 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3060-3 / ₹ 495.00



## ENGINEERING

### Chemical (THERMAL ENGINEERING)

#### 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.

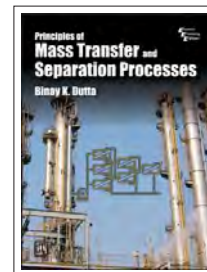
**CONTENTS:** Foreword. Preface. Acknowledgements. Introduction to Mass Transfer. Diffusion. Mass Transfer Coefficient and Interphase Mass Transfer. Equipments for Gas–Liquid Operating. Humidification. Drying. Crystallisation. Absorption. Distillation. Extraction. Leaching. Adsorption. Appendix. Index.



Latest Print 2013 / 440 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-4169-2 / ₹ 375.00

PHI Learning: Publications

#### Principles of Mass Transfer and Separation Processes



**BINAY K. DUTTA**,  
*Professor in the Chemical  
Engineering Department of  
Universiti Teknologi Petronas,  
Malaysia.*

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 2014 / 960 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2990-4 / ₹ 550.00



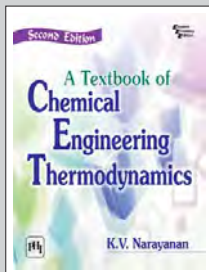


## ENGINEERING

### Chemical (THERMAL ENGINEERING)

#### Textbook of Chemical Engineering Thermodynamics, A 2nd ed.

**K.V. NARAYANAN**, former Professor and Head, Department of Chemical Engineering, Government Engineering College, Thrissur (Kerala).



Designed as an undergraduate-level textbook in Chemical Engineering, this student-friendly, thoroughly class-room tested book, now in its second edition, continues to provide an in-depth analysis of chemical engineering thermodynamics. The book has been so organized that it gives comprehensive coverage of basic concepts and applications of the laws of thermodynamics in the initial chapters, while the later chapters focus at length on important areas of study falling under the realm of chemical thermodynamics. The reader is thus introduced to a thorough analysis of the fundamental laws of thermodynamics as well as their applications to practical situations. This is followed by a detailed discussion on relationships among thermodynamic properties and an exhaustive treatment on the thermodynamic properties of solutions. The role of phase equilibrium thermodynamics in design, analysis, and operation of chemical separation methods is also deftly dealt with. Finally, the chemical reaction equilibria are skillfully explained.

Besides numerous illustrations, the book contains over 200 worked examples, over 400 exercise problems (all with answers) and several objective-type questions, which enable students to gain an in-depth understanding of the concepts and theory discussed.

The book will also be a useful text for students pursuing courses in chemical engineering-related branches such as polymer engineering, petroleum engineering, and safety and environmental engineering.

#### NEW TO THIS EDITION

- More Example Problems and Exercise Questions in each chapter
- Updated section on Vapour-Liquid Equilibrium in Chapter 8 to highlight the significance of equations of state approach
- GATE Questions up to 2012 with answers

**CONTENTS:** Preface. Preface to the First Edition. Introduction and Basic Concepts. First Law of Thermodynamics. *P-V-T* Behaviour and Heat Effects. Second Law of Thermodynamics. Some Applications of the Laws of Thermodynamics. Thermodynamic Properties of Pure Fluids. Properties of Solutions. Phase Equilibria. Chemical Reaction Equilibria. Appendixes. Answers to Problems. Index.

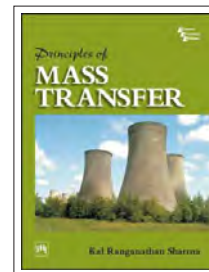


Latest Print 2014 / 568 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4747-2 / ₹ 375.00

### Chemical (TRANSPORT PHENOMENA)

#### Principles of Mass Transfer

**KAL RENGANATHAN SHARMA**, Adjunct Professor, Department of Chemical Engineering, Roy G. Perry College of Engineering, Prairie View, A&M University.



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 discoloration 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

## ENGINEERING

Civil/Environmental (CONSTRUCTION MATERIALS)

### Building Construction

**P.C. VARGHESE**, *Honorary Professor at Anna University, Chennai, was formerly Professor and Head, Department of Civil Engineering, IIT Madras.*



A companion volume to the author's book on *Building Materials*, this book, explains the basics of building construction practices in an accessible style. It discusses in detail every element of building construction from start to the finish—from site preparation to provision of services (such as water supply, drainage and electricity supply). Besides, the text describes acoustics and maintenance of buildings, which are important considerations in construction of buildings.

This book is primarily designed as an introductory textbook for undergraduate students of civil engineering as well as those pursuing diploma courses in civil engineering and architecture. Practising engineers and any person who has a keen interest in the construction and maintenance of his/her own building will also find the book very helpful.

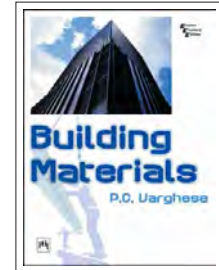
**CONTENTS:** Foreword. Preface. Acknowledgements. Components of a Building and Building Specifications. Site Preparation and Setting Out of Works. Earthwork and Antitermite Treatment. Construction of Foundation. Brick Masonry. Block Masonry. Stone Masonry. Arches and Lintels. DPC and Waterproofing of Basements. Concrete Work. Temporary Works: Formwork and Scaffolding. Bending and Placing of Reinforcement in RCC Works. Plastering and Pointing. Flooring—General Considerations. Concrete and Brick Floors. Stone Floors. Ceramic Tile Floors and Walls. Resilient Floors. Woodblock and Parquet Flooring. Terrazzo Work. Flat-floor and Flat-roofs Constructions. Sloped Roofs. Doors, Windows and Ventilators. Timber Joints and Glazing. Stairs and Lifts. Painting. Waterproofing and Weatherproofing RC Roofs and Waterproofing Wet Areas. Roof Drainage and Repair of Leakage. Water Supply in Buildings. Drainage of Wastewater and Sewage above Ground. Drainage of Foul Water below the Ground Level. Electricity Supply in Buildings. Common Equipment Used in Construction of Ordinary Buildings. Municipal Requirements in Planning of Buildings. Design of Buildings for Comfort in Hot Climates. Acoustics of Buildings. Welding and Structural Steelworks. Joining Pipes. Miscellaneous Works. Maintenance of Buildings. Appendices—A. Design of Brick Masonry Walls. B. Earthquake-Resistant Design of Masonry Buildings. C. Estimating Costs and Material Requirements. D. Major Items of Works for Construction of a Single-storey Residential Building. E. Equivalent Plain Areas of Uneven Surfaces for Payment for Painting of Building Works. F. Syllabus for Building Construction. References. Index.



Latest Print 2013 / 472 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3083-2 / 350.00

### Building Materials

**P.C. VARGHESE**, *Honorary Professor at Anna University, Chennai, was formerly Professor and Head, Department of Civil Engineering, IIT Madras.*



This practice-oriented book provides a lucid yet comprehensive coverage of the engineering properties and uses of the materials commonly used in building construction in India. Profusely illustrated with tables and diagrams, the book exposes the reader to the basics of building materials and their specifications. The text also acquaints the reader with the traditional as well as modern materials available in the market. The references to IS codes and standards make this text suitable for further study and field use.

This book is primarily designed as an introductory textbook for the students pursuing undergraduate degree (B.E./ B.Tech.) and diploma courses in civil engineering and architecture. Because of the lecture-based presentation of the subject, the text would also be of considerable benefit for the young teachers for their classroom lectures. Practising engineers would also get a clear understanding of the fundamentals of the subject.

#### KEY FEATURES

- Review questions at the end of each chapter enable the reader to recapitulate the topics.
- Considerable attention is given on field practice.
- Syllabus of laboratory work on construction materials and a model question paper (Anna University) are given in appendices to guide the reader.

**CONTENTS:** Preface. Acknowledgements. Building Stones. Clay Bricks. Cement and Concrete Blocks. Lime. Cement. Pozzolanas. Sand (Fine Aggregate). Coarse Aggregate. Water. Mortars and Plasters. Cement Concrete. Special Structural Concretes. Mix Design of Ordinary Grade Concrete. Concrete Chemicals and Ready-Mixed Concrete. Timber. Industrial Timber Products. Glass for Buildings. Cast Iron and Steel. Market Forms of Steel for Building Construction. Aluminium and its Alloys. Other Metals and their Alloys. Paints, Distempers and Varnishes. Rubber. Plastics. Asphalt, Bitumen and Tar. Adhesives, Sealants and Joint Fillers. Ceramic Products. Asbestos and Asbestos-Cement. Geosynthetics. Waterproofing of Cement Works. Materials for Flooring. Light Roofing Materials. Pipes Used in Building Construction. Door and Window Fittings. Appendices. Index.

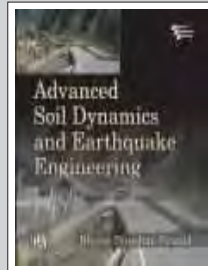
Latest Print 2014 / 288 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2848-8 / 225.00



## ENGINEERING

### Civil/Environmental (EARTHQUAKE)

#### Advanced Soil Dynamics and Earthquake Engineering



**BHARAT BHUSHAN PRASAD**, *Professor and Head, Department of Civil Engineering, Galgotias College of Engineering and Technology, Greater Noida.*

This text presents the applications of soil dynamics and earthquake engineering for seismic-resistant design of foundations and earth-retaining structures. It is a sequel to the author's book entitled *Fundamentals of Soil Dynamics and Earthquake Engineering* that presents the basic principles, whereas advanced topics have been covered in this text.

The book discusses topics such as the emerging challenges to seismic-resistant foundations and other soil-retaining structures, the practical issues of soil investigations for a specific project, the basic principles of vibrations along with their practical applications to civil engineering structures, the dynamic stability of elastic systems, the dynamic response to bomb blast loading and their effect on foundations and sub-structures, the dynamics of beam on elastic foundations, and the dynamics of foundations.

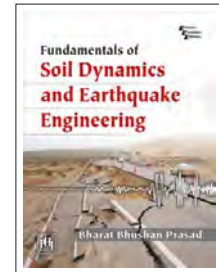
This textbook is essentially meant for undergraduate students in Civil Engineering and also covers the postgraduate course in Earthquake Engineering. The book will also be helpful as a ready reference for design and consulting engineers.

**CONTENTS:** Preface. Introduction. Site Investigations. Dynamics of Elastic Systems. Dynamic Stability of Beam-foundation Systems. Dynamic Response to Bomb Blast Loading. Dynamics of Beams and Plates on Elastic Foundations. Dynamic Response of Foundations. Ground Response Analysis. Machine Foundations. Seismic Stability of Slopes. Earthquake Resistant Design of Foundations and Other Soil Retaining Structures. Vibration Isolation and Control. References. Index.



Latest Print 2014 / 940 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4039-8 / ₹ 695.00

#### Fundamentals of Soil Dynamics and Earthquake Engineering



**BHARAT BHUSHAN PRASAD**, *Professor and Head, Department of Civil Engineering, Galgotias College of Engineering and Technology, Greater Noida.*

The majority of the cases of earthquake damage to buildings, bridges, and other retaining structures are influenced by soil and ground conditions. To address such phenomena, Soil Dynamics and Earthquake Engineering is the appropriate discipline.

This textbook presents the fundamentals of Soil Dynamics, combined with the basic principles, theories and methods of Geotechnical Earthquake Engineering. It is designed for senior undergraduate and postgraduate students in Civil Engineering & Architecture. The text will also be useful to young faculty members, practising engineers and consultants. Besides, teachers will find it a useful reference for preparation of lectures and for designing short courses in Soil Dynamics and Geotechnical Earthquake Engineering.

The book first presents the theory of vibrations and dynamics of elastic system as well as the fundamentals of engineering seismology. With this background, the readers are introduced to the characteristics of Strong Ground Motion, and Deterministic and Probabilistic seismic hazard analysis. The risk analysis and the reliability process of geotechnical engineering are presented in detail. An in-depth study of dynamic soil properties and the methods of their determination provide the basics to tackle the dynamic soil-structure interaction problems. Practical problems of dynamics of beam-foundation systems, dynamics of retaining walls, dynamic earth pressure theory, wave propagation and liquefaction of soil are treated in detail with illustrative examples.

**CONTENTS:** Preface. Introduction. Seismology and Earthquakes. Theory of Vibrations. Dynamics of Elastic System. Wave Propagation. Dynamic Soil Properties. Dynamic Earth Pressure. Strong Ground Motion. Seismic Hazard Analysis. Liquefaction of Soils. Risk, Reliability and Vulnerability Analysis. Appendix: Vibration Measurements. References. Index.

Latest Print 2013 / 584 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2670-5 / ₹ 495.00

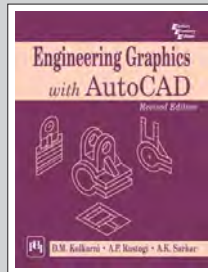


## ENGINEERING

Civil/Environmental (ENGINEERING DRAWING)

Civil/Environmental (ENVIRONMENTAL)

### 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. Inter-section of Surfaces. Freehand Sketching. Index.

 Latest Print 2014 / 344 pp. / 21.6 × 27.8 cm  
ISBN-978-81-203-3783-1 / ₹ 325.00

PHI Learning: Publications

### Elements of Environmental Science and Engineering, 2nd ed.



**P. MEENAKSHI**, Department of Civil Engineering, Coimbatore Institute of Technology, Coimbatore, Tamil Nadu.

Designed as a text for all undergraduate students of engineering for their core course in Environmental Science and Engineering and for elective courses in environmental health engineering and pollution and control engineering for students of civil engineering, this comprehensive text provides an in-depth analysis of the fundamental concepts. It also introduces the reader to different niche areas of environmental science and engineering.

The book covers a wide array of topics, such as natural resources, disaster management, biodiversity, and various forms of pollution, viz. water pollution, air pollution, soil pollution, noise pollution, thermal pollution, and marine pollution, as well as environmental impact assessment and environmental protection.

#### KEY FEATURES

- Gives in-depth yet lucid analysis of topics, making the book user-friendly.
- Covers important topics, which are adequately supported by illustrative diagrams.
- Provides **case studies** to explore real-life problems.
- Supplies review questions at the end of each chapter to drill the students in self-study.

**CONTENTS:** Preface. Environmental Education—Present Scenario. Science of the Environment. Natural Resources. Disaster Management. Engineering Interventions. Ecosystems. Biodiversity. Water Pollution. Air Pollution. Soil Pollution. Noise Pollution. Thermal Pollution. Marine Pollution. Solid Wastes. Hazardous Wastes. Energy. Environmental Threats. Environmental Impact Assessment. Social Issues and the Environment. Environmental Protection. Index.

Latest Print 2014 / 324 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4523-2 / ₹ 295.00

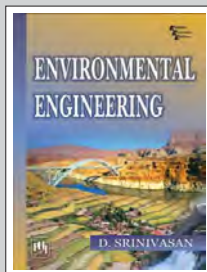


## ENGINEERING

Civil/Environmental (ENVIRONMENTAL)

### Environmental Engineering

**D. SRINIVASAN**, formerly Professor, Department of Chemical Engineering, Anna University, Chennai.



During the last two decades, the environmental pollution regulations have undergone a vast change. Attempts have been made to refine the conventional technologies and to develop new technologies to meet increasingly more stringent environmental quality criteria. The challenge that one faces today is to meet these stringent requirements in an environmentally acceptable and cost effective manner.

The present book addresses the application of the state-of-the-art technology to the solutions to today's problems in industrial effluent pollution control and environmental protection. The highlight of this book is the inclusion of the salient features of process modifications and other important methods and techniques for the minimization of wastes. The chapter on process modification for waste minimization provides new technical features and tools, latest technologies and techniques, and other industrial operations. Besides, the text covers the role of an environmental engineer in the methodology for making pollution control decisions.

#### KEY FEATURES

- Includes numerous self-explanatory tabular and diagrammatic representations.
- Presents pollution problems of few chemical and processing industries.
- Provides **case studies** on environmental pollution problems and their prevention.
- Analyzes thoroughly the planning and strategies of environmental protection.

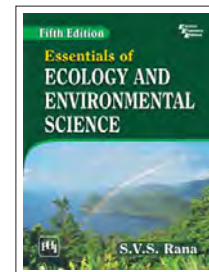
Designed as a textbook for the undergraduate students of civil and chemical engineering, this book will also be useful to the postgraduate students of environmental science and engineering.

**CONTENTS:** Preface. Acknowledgements. Introduction. Biogeochemical Cycles. The Chemistry of Waste Waters. Water Quality. Waste Water Treatment and Disposal. Air Quality. Treatment Systems for Air Pollution Control. Industrial Pollution and Waste Treatment in a Few Chemical and Processing Industries. Solid Wastes. Waste Minimization and Pollution Prevention. Planning Process for Prevention of Pollution. Strategies for Pollution Prevention. Hazardous Waste Management. Case Studies. Appendices. References. Index.



Latest Print 2012 / 440 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3600-1 / ₹ 350.00

### Essentials of Ecology and Environmental Science, 5th ed.



**S.V.S. RANA**, former Vice Chancellor of Bundelkhand University, Jhansi. He has served Chaudhary Charan Singh University, Meerut as Professor and Head, Department of Zoology; Coordinator, Department of Environmental Science; and Coordinator, UGC Innovative Assistance Program in Toxicology.

This revised fifth edition, is a lucid presentation of the fundamental concepts and principles of ecology and environmental science. Extensively illustrated, the book provides in-depth coverage of major areas such as atmospheric and soil science, hydrobiology, biodiversity, and pollution ecology. It seeks to impart comprehensive understanding of the major ecological issues, policies and laws, crucial for solving environmental problems. New sections on vital topics such as acid rain and deposition, metapopulations, environmental disasters and the Bali Summit on Climate Change 2007 contribute strongly to this endeavour.

The book is primarily intended for undergraduate (B.Sc.) students of environmental science and other relevant biological sciences. It will also be very useful for postgraduate (M.Sc.) students of these subjects as well as field professionals and researchers.

#### KEY FEATURES

- Use of indigenous examples for explaining subject matter
- Coverage of extreme environments such as Antarctica, the Arctic region, open oceans, and deserts, along with up-to-date information on major ecosystems
- Chapters devoted to biodiversity as well as natural and genetic resources of India
- Detailed descriptions of eco-compartments such as atmosphere and lithosphere

**CONTENTS:** Preface. Preface to the First Edition. Acknowledgements. Definition, Scope and History of Ecology. Ecology and Evolution. Environmental Adaptations. Climate and Atmosphere. Earth and Lithosphere. Hydrosphere. Biosphere. Bio-Geochemical and Nutrient Cycles. Environmental Factors and Species Interactions. Biodiversity. Genetic Resources. Natural Resources (Minerals, Energy, Water, Forests). Ecology of Populations. Concept of Community. Ecosystem (Structure and Function). Fragile Ecosystems. Air Pollution. Water Pollution. Noise Pollution. Radioactive Pollution. Solid Waste Pollution. Land Pollution. Global Environmental Problems. Environmental Disasters. Environmental Institutions, International Cooperation and Law. Glossary. Index.

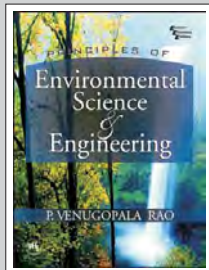
Latest Print 2013 / 608 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-4786-1 / ₹ 375.00



## ENGINEERING

Civil/Environmental (ENVIRONMENTAL)

### Principles of Environmental Science and Engineering



**P. VENUGOPALA RAO**, Director, Sridevi Women's Engineering College, Hyderabad.

Primarily intended as a text for undergraduate students of engineering for their core course in environmental studies, this book gives a clear introduction to the fundamental principles of ecology and environmental science and aptly summarizes the relationship between ecology and environmental engineering.

Divided into three parts, the book begins by discussing the biosphere, natural resources, ecosystems, biodiversity, and community health. Then it goes on to give detailed description on topics such as pollution and control, environmental management, and sustainable development. Finally, it focuses on environmental chemistry, environmental microbiology, and monitoring and analysis of pollutants.

#### KEY FEATURES

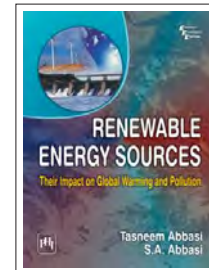
- Key words and summary at the end of each chapter provide the students an easy way of recapitulation.
- A large number of figures illustrate the topics discussed.
- Projects of environmental concern suggested at the end of the book enable the students to work in field projects.

Besides engineering students, undergraduate students in other streams, practicing engineers and professionals would find the text immensely useful.

**CONTENTS:** Preface. Part 1: Ecosystems and Population Welfare—Biosphere. Natural Resources. Ecosystems. Biodiversity and Its Conservation. Community Health. Part 2: Pollution Control and Environmental Management—Pollution and Control. Environmental Concerns. Environmental Management. Sustainable Development. Part 3: Environmental Science—Environmental Chemistry. Environmental Microbiology. Monitoring and Analysis of Pollutants. Appendix. Glossary. General Questions for Study and Assignment. Index.

 Latest Print 2012 / 288 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-2893-8 / ₹ 225.00

### Renewable Energy Sources: Their Impact on Global Warming and Pollution



**TASNEEM ABBASI**, Assistant Professor, Centre for Pollution Control and Energy Technology, Pondicherry University, Pondicherry.

**S.A. ABBASI**, Senior Professor and Coordinator, Centre for Pollution Control and Energy Technology, 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.**

— Dr. FAROOQ ABDULLAH  
Hon'ble Minister, New and Renewable Energy  
Government of India

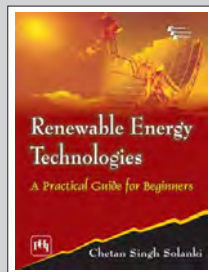
**CONTENTS:** Foreword. Preface. From Renewables to Renewables: The Human Quest for Energy Comes Full Circle. Pollution and Global Warming Due to the Use of Fossil Fuels: The Extent of the Problem. Direct Solar. Biomass Energy. Biogas Energy. Wind Energy. Wave Energy. 8. Tidal Energy. Geothermal Energy. Small Hydro. Hydrogen as a Renewable Energy Source. Storage of Intermittently-generated Renewable Energy. Decarboni-zation of Fossil Fuel Use by CO<sub>2</sub> Capture. Is the Use of Renewable Energy Sources an Answer to the Problems of Global Warming and Pollution? References. Index.

 Latest Print 2013 / 332 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3994-1 / ₹ 325.00

## ENGINEERING

Civil/Environmental (ENVIRONMENTAL)

### Renewable Energy Technologies: A Practical Guide for Beginners



**CHETAN SINGH SOLANKI**, Associate Professor, Department of Energy Science and Engineering, Indian Institute of Technology Bombay (IITB).

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.

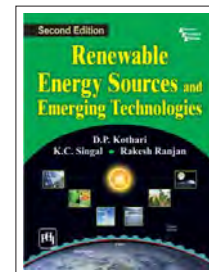
The book helps beginners to understand the basic energy conversion processes involved in various renewable energy based equipment such as solar photovoltaics, solar water heaters, wind turbines, and biomass plants. Under each technology, several possible system configurations and their usages are considered. 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 2011 / 168 pp. / 16.0 × 24.1 cm**  
**ISBN-978-81-203-3434-2 / ₹ 225.00**

### Renewable Energy Sources and Emerging Technologies, 2nd ed.



**D.P. KOTHARI**, Director General of Vindhya Group of Institutions, Indore.

**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.

**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 Hydropower. 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**



## ENGINEERING

Civil/Environmental (ENVIRONMENTAL)

### Solid Waste Management



**K. SASIKUMAR**, *Professor and Head, Department of Commerce, University of Kerala, Thiruvananthapuram.*  
**SANOOP GOPI KRISHNA** is *Environmental Engineering Consultant.*

Safe and effective management of solid waste generated by the community governmental agencies and industries is the need of the hour. This compact book describes how to avoid, minimize and manage solid waste and discusses models which, if implemented, can solve many of the current solid waste problems.

The text discusses the various sources of waste generation, composition of solid waste and the need for designing a strategic plan for solid waste management. It explains the importance of public involvement, and public awareness in managing solid waste besides giving an account of solid waste management hierarchy. In addition, the text describes in detail factors to be considered while developing a waste management programme, techniques for the recovery, reuse or recycling of solid waste, techniques of composting, and how to manage special wastes such as bio-medical waste, plastic, and e-waste. **Case Studies** of selected municipal corporations lend a practical flavour to the book.

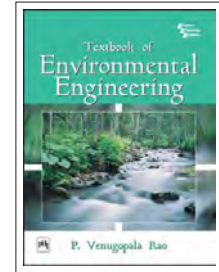
The book is intended as a text for B.Tech. (Civil/Chemical Engineering) and M.Tech. (Civil/Environment Engineering, Environmental Science). Besides, it will be quite handy for consultants in solid waste management, environmental engineers, and municipal corporations.

**CONTENTS:** Foreword. Preface. Introduction. Solid Waste Management—Strategic Planning. Decision Making in Solid Waste Management—Integrated Solid Waste Management. Public Involvement and Participation in Solid Waste Management. Solid Waste Management Programme. Collection and Transfer of Municipal Solid Waste. Solid Waste Management Techniques. Recycling of Solid Waste. Waste Disposal Techniques. Solid Waste Management of Bio-Medical Waste, Plastic and e-Waste. Case Studies. Glossary. Index.



Latest Print 2014 / 308 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-3869-2 / ₹ 275.00

### Textbook of Environmental Engineering



**P. VENUGOPALA RAO**, *Director, Sridevi Women's Engineering College, Hyderabad.*

Designed for a first-course in environmental engineering for undergraduate engineering and postgraduate science students, the book deals with environmental pollution and its control methodologies. It explains the basic environmental technology — environmental sanitation, water supply, waste management, air pollution control and other related issues — and presents a logical and systematic treatment of topics.

The book, an outgrowth of author's long experience in teaching the postgraduate science and engineering students, is presented in a student-oriented approach. It is interspersed with solved examples and illustrations to reinforce many of the concepts discussed and apprise the readers of the current practices in areas of water processing, water distribution, collection and treatment of domestic sewage and industrial waste water, and control of air pollution. It emphasizes fundamental concepts and basic applications of environmental technology for management of environmental problems.

Besides students, the book will be useful to the academia of environmental sciences, civil/environmental engineering as well as to environmentalists and administrators working in the field of pollution control.

**CONTENTS:** Preface. Ecology. Environmental Sanitation. Drinking Water. Domestic Sewage. Waste Water from Industries. Air Pollution. Monitoring and Analysis. Environmental Management. Appendices—A: Toxic Wastes. B: Geographical Information System. C: Disaster Management. Bibliography. Index.

Latest Print 2013 / 280 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-1930-1 / ₹ 250.00



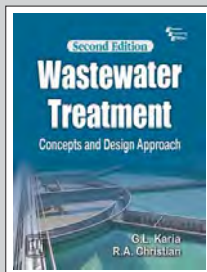


## ENGINEERING

### Civil/Environmental (ENVIRONMENTAL)

#### Wastewater Treatment: Concepts and Design Approach, 2nd ed.

**G.L. KARIA**, Senior Technical Consultant with Sapient Techno Consultants, Surat.



**R.A. CHRISTIAN**, Associate Professor, Department of Civil Engineering, S.V. National Institute of Technology, Surat. He is also holding administrative position at S.V. National Institute of Technology.

This thoroughly revised **Second Edition** presents a comprehensive account of the principles of operation and design of wastewater treatment plants.

Beginning with the basic concepts of treatment of wastewater and the design considerations required of an efficient treatment plant, the book moves on to spotlight the design criteria for domestic wastewater treatment units. In essence, the text gives the detailed procedures for design computations of all units of a wastewater treatment plant. It also describes the most common types of reactors used for physical operations and biological processes in wastewater treatment plants.

Besides additional examples and exercises, this edition also includes a new chapter on "Disinfection of Wastewater".

The book is intended for the undergraduate students of Civil and Environmental Engineering. It will also be useful to the practising professionals involved in the design of wastewater treatment plants.

#### KEY FEATURES

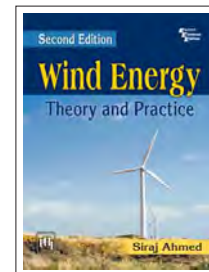
- Provides several examples supported by graphs and sketches to highlight the various design concepts of wastewater treatment units.
- Encapsulates significant theoretical and computational information, and useful design hints in **Note** and **Tip** boxes.
- Includes well-graded practice exercises to help students develop the skills in designing treatment plants.

**CONTENTS:** Preface. Acknowledgements. Wastewater and Treatment Concepts. Basic Design Considerations. General Procedure for Design Calculations. Reactions and Reactors. Design of Preliminary Treatment Units. Design of Primary Treatment Units. Biological Treatment of Wastewater: Aerobic Processes. Design of Secondary Biological Treatment Units: Suspended Growth Process. Designs of Aerobic Biological Treatment Units: Attached Growth Processes. Anaerobic Biological Wastewater Treatment. Design of Sludge Treatment Units. Disinfection of Wastewater. Appendices—I: List of Some Useful Conversion Factors. II: Dimension Details of Parshall Flume (mm). III: Physical Properties of Water. IV: Symbols and Units Used in Wastewater Treatment (in SI Units). References. Index.



Latest Print 2014 / 452 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4735-9 / 425.00

#### 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 2013 / 352 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4490-7 / 395.00

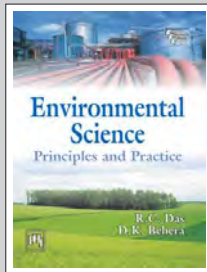


## ENGINEERING

Civil/Environmental (ENVIRONMENTAL SCIENCE)

Civil/Environmental (ENVIRONMENTAL TECHNOLOGY)

### Environmental Science: Principles and Practice



**R.C. DAS**, Consulting Professor, Xavier Institute of Management, Bhubaneswar (Formerly, Vice Chancellor, Berhampur University, Orissa; Chairman, Orissa State Pollution Control Board, Bhubaneswar).

**D.K. BEHERA**, Senior Environmental Scientist, State Pollution Control Board, Orissa.

This book fulfills the need for a practical, clearly written introductory textbook on fundamental concepts and basic applications of principles of environmental science. It is designed to cover the curriculum of B.Sc. and M.Sc. courses in Environmental Science.

Besides students, the basic knowledge of environmental management is highly essential today for regulators, industrial managers, and environmental activists. The book provides comprehensive information on all relevant components relating to environmental issues in industries, the purpose being to sensitize the management staff to various environmental laws and regulations.

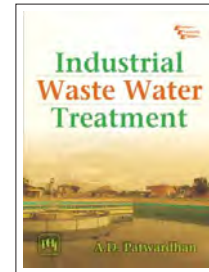
The book not only gives a thorough treatment of all individual environmental components but also suggests strategies for improvement of environment quality. It discusses various pollution control methodologies along with waste minimization and resource conservation. An attempt is also made to blend the legal guidelines and statutory compliance with technical and scientific approach.

Various environmental management tools have been discussed. Management of hazardous chemicals has been dealt with in a separate chapter.

**CONTENTS:** Preface. Abbreviations. Basic Concepts of Ecology and Environment. Water Pollution (Basic Principles). Water Pollution Control Methods. Air Pollution (Basic Principles). Air Pollution Control Methods. Noise Pollution. Vehicular Pollution. Environmental Laws and Constitutional Provisions. Pollution Control Norms and Standards. Waste Minimization and Resource Conservation. Management of Solid Wastes Including Hazardous Wastes. Management of Hazardous Chemicals and Chemical Accidents. Environment Impact Assessment. Environmental Audit. Environmental Management System. Index.

 Latest Print 2007 / 376 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3330-7 / ₹ 250.00

### Industrial Waste Water Treatment



**A.D. PATWARDHAN**, Process Design Consultant and formerly Professor at VJTI, Mumbai.

All industrial production processes generate waste waters, which can pollute water bodies into which they are discharged without adequate treatment. It is, therefore, essential to treat such wastes and eliminate their harmful effects on the environment.

This book discusses sources, characteristics and treatment of waste waters produced in industries such as textiles, dairy, tanneries, pulp and paper, fertilizer, pesticide, organic and inorganic chemicals, engineering and fermentation. Many flow diagrams have been included to illustrate industrial processes and to indicate the sources of waste water in such processes. After describing treatment for individual factories, the author discusses the more advanced and economical common effluent plants. The text uses simple and straightforward language and makes the presentation attractive.

This book should prove extremely useful to undergraduate students of civil and chemical engineering and postgraduate students of environmental science and engineering. Industrial design consultants will also find the book very handy. To the Greens, it may offer some of the solutions to their concerns.

**CONTENTS:** Preface. Treatment of Industrial Waste Waters. Flow Measurement, Characterization and Treatability Studies of Industrial Waste Waters. Unit Operations and Unit Processes. Stream Pollution and Self-Purification. Pretreatment of Industrial Wastes. Textile Wastes. Dairy Wastes. Slaughtering, Meat Packing, Poultry Processing, Fish Processing and Rendering Wastes. Tannery Wastes. Sugar Mill Wastes. Pulp and Paper Mill Wastes. Fermentation Industry Wastes. The Engineering Industry. Petroleum Refining Industry. Petrochemicals Industry. Fertilizer and Pesticides Industries. Vegetable Oil, Food and Allied Industries. Dyestuff and Dye Manufacturing Industries. Rubber Wastes. Radioactive Wastes. Organic and Inorganic Chemicals. Common Effluent Treatment Plants. Index.

Latest Print 2013 / 304 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-3350-5 / ₹ 295.00

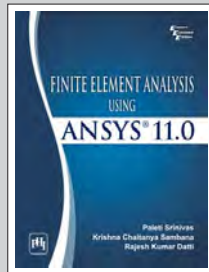


## ENGINEERING

Civil/Environmental (FINITE ELEMENTS)

### 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**, 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 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™, 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

### Finite Element Method and Computational Structural Dynamics

**MANISH SHRIKHANDE**, Professor at Department of Earthquake Engineering, Indian Institute of Technology Roorkee, and a member of Indian Society of Earthquake Technology and Earthquake Engineering Research Institute.



Primarily intended for senior undergraduate and postgraduate students of civil, mechanical and aerospace/aeronautical engineering, this text emphasises the importance of reliability in engineering computations and understanding the process of computer aided engineering.

Written with a view to promote the correct use of finite element technology and to present a detailed study of a set of essential computational tools for the practice of structural dynamics, this book is a ready-reckoner for an in-depth discussion of finite element theory and estimation and control of errors in computations. It is specifically aimed at the audience with interest in vibrations and stress analysis. Several worked out examples and exercise problems have been included to describe the various aspects of finite element theory and modelling. The exercise on error analysis will be extremely helpful in grasping the essence of posteriori error analysis and mesh refinement.

#### KEY FEATURES

- Thorough discussion of numerical algorithms for reliable and efficient computation.
- Ready-to-use finite element system and other scientific applications.
- Tips for improving the quality of finite element solutions.
- Companion DVD containing ready to use finite element applications.

**CONTENTS:** Preface. List of Figures. List of Tables. About the CAELinux LiveDVD. Part I: Finite Element Method—Mathematical Modelling, Differential Equations and Approximate Solutions. Finite Elements of One-Dimension. Finite Elements of Two and Three Dimensions. Mapped Elements. Finite Elements for Plates and Shells. Error Analysis and Convergence of Finite Element Solution. The Time Dimension. Part II: Computational Structural Dynamics—Solution of Linear Simultaneous Equations. The Algebraic Eigenvalue Problem. Singular Value Decomposition. Time Marching: Numerical Solution of Initial Value Problems. Discrete Fourier Transform. System Identification: The Inverse Vibration Problem. Model Reduction in Computational Structural Dynamics. Part III: Appendices—A: A Primer on Floating-Point Computations. B: A Primer on Vector Spaces. C: A Primer on Interpolation. D: A Primer on Numerical Quadrature. E: Assembly of Global System of Equations. F: Internet Resources for Scientific Computing. Index.

Latest Print 2014 / 484 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4995-7 / ₹ 550.00



## ENGINEERING

Civil/Environmental (FINITE ELEMENTS)

### Finite Element Methods: Basic Concepts and Applications



**CHENNAKESAVA R. ALAVALA**, Professor in the Department of Mechanical Engineering, Jawaharlal Nehru Technological University (JNTU), 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 shape 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.

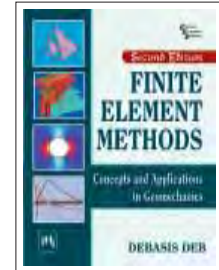
Latest Print 2014 / 408 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3584-4 / ₹ 325.00



PHI Learning: Publications

### Finite Element Methods: Concepts and Applications in Geomechanics, 2nd ed.



**DEBASIS DEB**, Professor in the Department of Mining Engineering at the Indian Institute of Technology Kharagpur.

Computational geomechanics is an emerging field in the disciplines of Mining, Civil and Geotechnical Engineering. Recent advancements in finite element methods (FEMs) have made it possible to solve a variety of complex problems related to geomechanics. This thoroughly revised second edition enhances the knowledge of the finite element methods in design and analysis of structures and excavations made in rock mass. A fine blend of finite element methodology and principles of rock mechanics, the text emphasizes the basics of stress-strain analysis, anisotropic material behaviour, isoparametric finite element method, rock mass yielding/failure behaviour and its formulation in FEM procedure, rock joint behaviour as equivalent material and discrete system. Analytical and numerical formulations of interaction between rock bolts and rock mass are introduced emphasizing parameters which affect bolt performance.

Besides senior undergraduate and postgraduate students of Mining, Civil and Geotechnical Engineering, the book would also be useful to practising engineers and researchers who wish to acquaint themselves with the state-of-the-art techniques of finite element methods.

#### NEW TO THIS EDITION

- Provides an in-depth analysis of strength and deformability of jointed rock mass.
- Discusses the application of airy stress function for solving problems in solid mechanics.
- Adds a new chapter on *Analysis of Rock Bolts*.
- Contains two new appendices—*Gauss Quadrature Rule and Closed Form Integration in Natural Coordinates*.
- Includes several new worked-out examples and exercises.
- Interaction between rock bolt and rock mass is analyzed
- Elaborates formulations.

**CONTENTS:** Preface. Analysis of Stresses and Strains. Stress-Strain Relationship. Introduction of Finite Element Method in Elasticity: Isoparametric Triangular Elements. Quadrilateral Finite Elements. Axisymmetric and Three-dimensional Finite Element Method. Rock and Rock Mass Failure Criteria. Elastic-Plastic Finite Element Analysis. Strength and Deformability of Jointed Rock Mass. Finite Element Procedures for Analysis of Rock Joints. Analysis of Rock Bolts. Appendices—A: Galerkin Finite Element Method. B: Skyline Storage of Stiffness Matrix. C: Gauss Quadrature Rule. D: Closed Form Integration in Natural Coordinates. References. Index.

Latest Print 2013 / 376 pp. / 17.8 × 23.5 cm

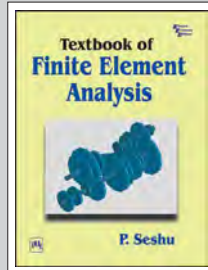
ISBN-978-81-203-4295-8 / ₹ 350.00



## ENGINEERING

Civil/Environmental (FINITE ELEMENTS)

### 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.

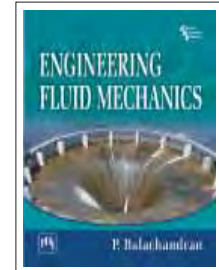
**CONTENTS:** Preface. Introduction. Finite Element Formulation Starting from Governing Differential Equations. Finite Element Formulation Based on Stationarity of a Functional. One-Dimensional Finite Element Analysis. Two-Dimensional Finite Element Analysis. Dynamic Analysis Using Finite Elements. Application Examples. Appendices—A: Suggested Miniproject 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 / ₹ 275.00

Civil/Environmental (FLUID MECHANICS)

### 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.

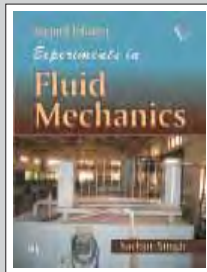
Latest Print 2014 / 872 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4072-5 / ₹ 495.00



## ENGINEERING

### Civil/Environmental (FLUID MECHANICS)

#### 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.

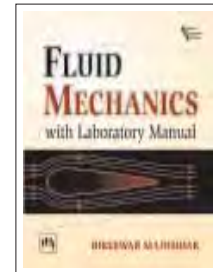
**CONTENTS:** Preface. Part I: Theory of Fluid Mechanics—Fluid Mechanics: An Introduction. Part II: Experiments—1. Flow Through a Variable Duct Area—Bernoulli's. 2. Calibration of Venturimeter. 3. Calibration of Orificemeter. 4. Determination of Friction Factor for Pipes of Different Materials. 5. Determination 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



#### 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 2011 / 512 pp. / 17.8 × 23.5 cm

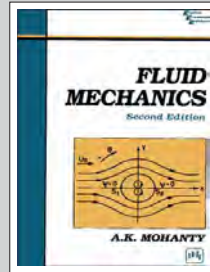
ISBN-978-81-203-4034-3 / ₹ 325.00



## ENGINEERING

### Civil/Environmental (FLUID MECHANICS)

#### 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.

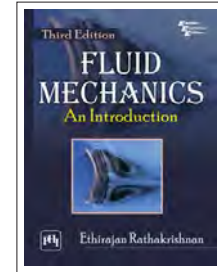
After a comprehensive introduction, the book goes on to present a thorough analysis of such topics as fluid statics, fluid kinematics, analysis of finite control volumes and the mechanical energy equation. It also provides a comprehensive description of, among others, one-dimensional viscous flow, dimensional 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 2014 / 544 pp. / 16.0 × 24.1 cm**  
**ISBN-978-81-203-0894-7 / ₹ 350.00**

#### 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.

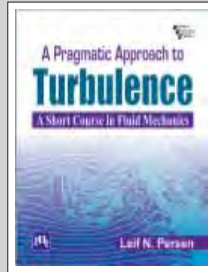
**Latest Print 2013 / 336 pp. / 16.0 × 24.1 cm**  
**ISBN-978-81-203-4593-5 / ₹ 275.00**



## ENGINEERING

Civil/Environmental (FLUID MECHANICS)

### 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 analyses free jet flow and shows that the discrepancies that originate from the concept of Reynolds stresses are nonexistent 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.

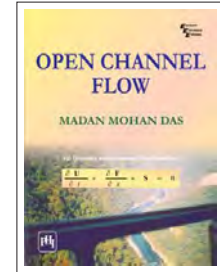
Illustrated with cases and large number of diagrams, the book emphasizes the importance of proper understanding of the physics of the flow based on logic and mathematical interpretation of experimental data.

**CONTENTS:** Preface. Fundamental Equations Governing the Fluid Flow. Basic Equations of Turbulent Flow. Closure Problem of Turbulent Flow. Free Turbulence (Jet and Wake Flow). Turbulent Boundary Layer I (Flat Plate). Turbulent Boundary Layer II (The Manipulated Layer). Analysis of Experimental Data. The Thermal Boundary Layer. Fundamental Aspects of Thermal Jets. References. Index.



Latest Print 2011 / 280 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4092-3 / ₹ 250.00

### Open Channel Flow



**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 intended as a textbook for the undergraduate and postgraduate students of civil engineering, this book provides a comprehensive knowledge in open channel flow.

The book starts with the concept of open channel flow, types of forces acting on the flow, types of channel flow, velocity distribution and coefficients, and basic continuity in 1D and 3D. Then it moves on to steady gradually varied flow, its differential equation, hydraulics of alluvial channel, design of channel and hydraulic jump. Finally, the text concludes with Saint-Venant equations and its solutions by few numerical methods in flood routing and dam-break situations.

#### KEY FEATURES

- Includes computer programs for steady gradually varied flow
- Provides various numerical methods of solving the equations
- Explains dam-break problem in detail
- Contains numerous solved examples

**CONTENTS:** Preface. Open Channel Flow. Uniform Flow. Specific Energy, Specific Force and Critical Depth Computation. Hydraulics of Alluvial Channels. Design of Channel. Gradually Varied Flow. Hydraulic Jump. Rapidly Varied Flow. Spatially Varied Flow. Unsteady Flow. Dam-Break Problem. Index.

Latest Print 2013 / 360 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3522-6 / ₹ 325.00





## ENGINEERING

Civil/Environmental (GEOTECHNICAL)

### Soil Mechanics



**M. PALANIKUMAR**, Associate Professor in Civil Engineering, PSG College of Technology, Coimbatore.

This book introduces the basic principles of engineering behaviour of soils. The text is designed in such a manner that the syllabi of a core course in Soil Mechanics/Geotechnical Engineering I prescribed in the curriculum of most of the Indian Universities is covered. While reading the text, student experiences classroom teaching–learning process. An emphasis is made on explaining the various concepts rather than giving the procedure.

After reading this book, students should be able to:

- Give an engineering classification of a soil
- Understand the principle of effective stress, and then calculate stresses that influence soil behaviour
- Calculate water flow through ground and understand the effects of seepage on the stability of structures.

This textbook is primarily intended for the undergraduate students of civil engineering.

#### KEY FEATURES

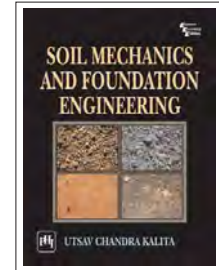
- Numerous numerical solved examples
- Objective Type Questions (with Answers) at the end of each chapter
- Use of SI Systems of units

**CONTENTS:** Preface. Notations. Introduction. Basic Definitions and Relations. Physical Properties of Soil. Classification of Soils. Compaction. Soil Water, Principle of Effective Stress and Permeability. Seepage Through Soils. Stress Distribution in Soil. Consolidation. Shearing Characteristics of Soils. Stability of Slopes. References. Index.

Latest Print 2013 / 368 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4838-7 / ₹ 350.00



### Soil Mechanics and Foundation Engineering



**UTSAV CHANDRA KALITA**, Professor and Academic Director, Assam Down Town University, Guwahati.

Designed for the undergraduate students of civil engineering, this textbook covers the theoretical aspects of soil mechanics and foundation engineering in a single volume.

The text is organized in two parts—Part I (*Soil mechanics*) and Part II (*Foundation engineering*): Part I includes the basic properties and strength of soil, vertical and lateral pressures, discussion on earthen dam, sheet piles, and stability analysis for hill slope in connection with hill road construction. Part II discusses shallow and deep foundations, approaches of analysis of machine foundation, and various methods of determining the bearing capacity of soil. A separate chapter is devoted to on-site investigation.

Besides the undergraduate students, this compendium will also be useful for students appearing for various competitive examinations such as GATE, IES and IAS. Consulting engineers in geotechnical engineering may also use this book as a reference.

#### KEY FEATURES

- Includes numerical problems (with solutions) in connection with construction of dams and highways in hilly region
- Figures and explanations to facilitate professionals and designers of machine foundation to solve the complex problem of stability analysis
- Objective-type questions to aid in UPSC examinations

**CONTENTS:** Preface. Historical Background. Part I: Soil Mechanics—Soil Definition, Classification and Properties. Permeability of Soil. Consolidation of Soil. Compaction of Soil. The Shear Strength of Soils. Distribution of Vertical Pressure. Lateral Earth Pressure. Stability of Slopes. Part II: Foundation Engineering—Bearing Capacity of Soil. Shallow Foundations. Deep Foundations. Machine Foundation. Subsoil Investigation. Index.

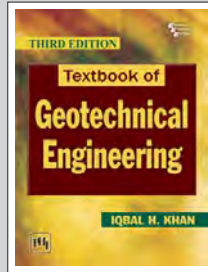
Latest Print 2014 / 292 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4080-0 / ₹ 275.00



## ENGINEERING

### Civil/Environmental (GEOTECHNICAL)

#### Textbook of Geotechnical Engineering, 3rd ed.



**IQBAL H. KHAN**, *Professor Emeritus in the Department of Civil Engineering, Jamia Millia Islamia, New Delhi.*

This revised Third Edition is a result of the positive feedback and constructive suggestions received from academics and students alike on the second edition. It also reflects the many years of teaching experience of the author as also his experience in research and consultancy on the subject.

While retaining the major contents of the earlier editions, the book consolidates on the subject, bringing in new areas of interest and concern.

#### What is new to this edition:

- A new chapter covering various geotechnical aspects of Earthquakes.
- All computer programs have been upgraded.

This text, which skillfully integrates theory and practice, would be suitable as a textbook for undergraduate students of civil engineering. The book can also be used, by a judicious choice of topics, by polytechnic students. In addition, practicing engineers would find the text very useful.

#### KEY FEATURES

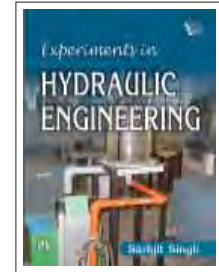
- Contains plenty of worked-out numerical examples.
- Gives a large number of Objective Type Questions and Exercises.
- Analyzes field problems and case histories.
- Makes the book accessible and interesting by logical organization and presentation of topics.

**CONTENTS:** Preface. Physical Properties of Soils. Water in Soils. Stresses in Soils. Consolidation and Settlement. The Shear Strength of Soils. Shallow Foundations. Site Investigation and Soil Improvement. Deep Foundations. The Stability of Slopes. Earth Pressure. Sheet-Pile Walls. Foundations for Machines. Environmental Geotechnology. Earthquakes: Geotechnical Aspects. Appendix—Site Investigation Report. Bibliography. Multiple-Choice Questions. Answers. Index.

Latest Print 2013 / 508 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-4510-2 / ₹ 375.00

### Civil/Environmental (HYDRAULICS)

#### Experiments in Hydraulic Engineering



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

The aim of this book is to enable the students to verify the principles studied in theory by conducting experiments. The book is designed for the undergraduate students of Civil Engineering.

This book contains 17 experiments selected from the prescribed syllabi of Hydraulic Engineering and Fluid Mechanics of several universities and institutes.

The first part of the book allows the students to review the fundamental theory before stepping into the laboratory environment. The second part provides the step-wise details 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 the Average values of Manning's coefficient to be used in various experiments.

**CONTENTS:** Preface. Part I: Theory of Hydraulic Engineering—Hydraulic Engineering: An Introduction. Part II: Experiments—1: Determination of Manning's Coefficient. 2: Velocity Distribution in Open Channel Flows. 3: Calibration of a Current Meter. 4: Flow through a Horizontal Contraction in a Channel. 5: Flow over a Vertical Contraction in a Channel. 6: Hydraulic Jump in a Rectangular Channel. 7: Calibration of a Venturiflume. 8: Calibration of a Standing Wave Flume. 9: Flow over a Broad-crested Weir. 10: Flow over a Spillway. 11: Free Overfall in a Rectangular Channel. 12: Determination of Viscosity by a Capillary Tube Viscometer. 13: Verification of Stokes' Law. 14: Establishment of Fully Developed Turbulent Flow in a Duct. 15: Velocity Distribution for Turbulent Flow in a Pipe. 16: Boundary Layer Formation over a Flat Surface. 17: Flow around a Cylinder Placed in Wind Stream. Appendix A: Questions. Appendix B: Physical Properties of Water, Air and Some Common Fluids. Average Values of Manning's Coefficient, N.

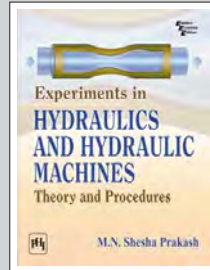
Latest Print 2012 / 412 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4533-1 / ₹ 225.00



## ENGINEERING

Civil/Environmental (HYDRAULICS)

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



**M.N. SHESHA PRAKASH**, is Professor, 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.

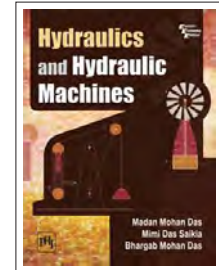
**CONTENTS:** Preface. Acknowledgement. Introduction. Experiments—Calibration of Collecting Tank (Gravimetric and Volumetric Method). Calibration of Pressure Gauges (Dead Weight Method). Flow Through a Variable Area Duct. Calibration of Notches. Calibration of Weirs. Calibration of Venturiflume. Calibration 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

### Hydraulics and Hydraulic Machines

**MADAN MOHAN DAS**, has been Professor, Civil Engineering Department, Assam Engineering College, Guwahati. An Emeritus Fellow of AICTE, Director of Technical Education, Government of Assam and a Telford Premium.



**MIMI DAS SAIKIA**, Professor, Civil Engineering, Assam Downtown University, Guwahati. She has been a Lecturer with the Department of Civil Engineering, National Institute of Technology, Silchar, an Associate Professor, Civil Engineering, Royal School of Engineering and Technology (RSET), Guwahati and Professor, Regional Institute of Science and Technology (RIST), Meghalaya.

**BHARGAB MOHAN DAS**, Chief Business Development Officer, Ritta Co. Ltd., Thailand.

Intended as a textbook for the undergraduate students of civil and mechanical engineering, this book is the outcome of authors' vast experience in this subject area. It presents the basic theories of hydraulics and all types of hydraulic machines that are used in these days in our day-to-day life.

Organized in two parts—Hydraulics (Part I) and Hydraulic Machines (Part II), the book is written in an easy-to-follow method in conformity to the syllabi followed in universities. The chapter end exercises of all the chapters are carefully prepared for the students, which enhance their problem-solving skills.

This book is also useful for the students of chemical, electrical and aeronautical engineering.

#### KEY FEATURES

- Copious well-illustrated figures
- Detailed description of various types of pumps and miscellaneous hydraulic machines
- Numerous solved problems and unsolved problems with answers
- Deductions and numerical examples in S.I. Units

**CONTENTS:** Preface. Hydraulics and Hydraulic Machines: An Introduction. **Part I: Hydraulics**—Physical Properties of Fluid. Hydrostatics. Hydrokinetics. Hydrodynamics. Flow Through Orifices and Mouthpieces. Flow Over Notches and Weirs. Flow Through Pipes. Flow in Open Channel. Laminar Flow. Turbulent Flow. Boundary Layer in Incompressible Flow. Dimensional and Model Analysis. **Part II: Hydraulic Machines**—Impact of Jets and Jet Propulsion. Reciprocating Pumps. Centrifugal Pumps. Miscellaneous Pumps and Fluid Machines. Hydraulic Turbines: An Introduction. Impulse Turbine: Pelton Wheel. Reaction Turbines. Performance of Turbines. Bibliography. Index.

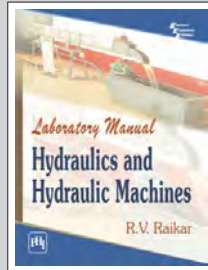
Latest Print 2013 / 556 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4799-1 / ₹ 395.00



## ENGINEERING

Civil/Environmental (HYDRAULICS)

### Laboratory Manual—Hydraulics and Hydraulic Machines



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

This manual presents 31 laboratory-tested experiments in hydraulics and hydraulic machines.

This manual is organized into two parts. The first part equips the student with the basics of fluid properties, flow properties, various flow measuring devices and fundamentals of hydraulic machines. The second part presents experiments to help students understand the basic concepts, the phenomenon of flow through pipes and flow through open channels, and the working principles of hydraulic machines. For each experiment, the apparatus required for conducting the experiment, the probable experimental set-up, the theory behind the experiment, the experimental procedure, and the method of presenting the experimental data are all explained. Viva questions (with answers) are also given. In addition, the errors arising during recording of observations, and various precautions to be taken during experimentation are explained with each experiment.

The manual is primarily designed for the undergraduate degree students and diploma students of civil engineering, mechanical engineering and chemical engineering.

**CONTENTS:** Foreword. Preface. Part I: Introductory Topics—Fluid and Its Properties. Flow Properties. Hydraulic Machines. Part II: Experiments—Experiments on Basic Concepts. Experiments on Pipes. Experiments on Open Channels. Experiments on Hydraulic Machines. Experiments on Tanks. Index.

Latest Print 2012 / 224 pp. / 17.8 × 23.5 cm



ISBN-978-81-203-4664-2 / ₹ 225.00

Civil/Environmental (HYDROLOGY)

### 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. Appendices.

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

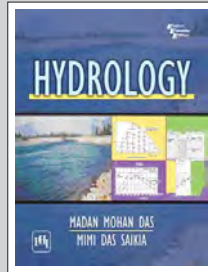
ISBN-978-81-203-4511-9 / ₹ 225.00



## ENGINEERING

### Civil/Environmental (HYDROLOGY)

#### Hydrology



**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.

Primarily intended as a textbook for the undergraduate and postgraduate students of civil engineering, this book introduces the concepts of hydrology in a comprehensive manner. It covers all the aspects of hydrology in 15 chapters.

The book starts with the hydrologic cycle which is the central concept of hydrology. Then it moves on to basics of hydrometeorology, abstraction losses like infiltration, runoff in different forms, instantaneous unit hydrograph (IUH) and its mathematical concepts like convolution integral, synthetic unit hydrograph (SUH) and S-hydrograph. Finally, the text concludes with estimation of flood by empirical equations and different flood frequency analysis, and hydrology of basin management which deals with soil conservation, watershed management and control of soil erosion that are very important for agricultural engineering.

#### KEY FEATURES

- Presents several numerical methods of solving unsteady hydraulic routing and ground flow equations.
- Contains solved examples to reinforce the understanding of the theory.
- Includes references in each chapter.

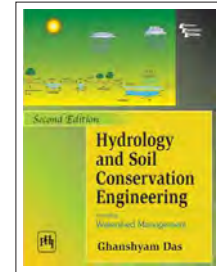
**CONTENTS:** Preface. Introduction. Hydrometeorology. Precipitation. Infiltration. Evapotranspiration. Runoff. Hydrographs. Methods of Discharge Measurement. Estimation of Flood. Flood Disaster Management Measures and Damage Estimation. River Engineering and River Training Works. Hydrologic Routing. Hydraulic Routing. Groundwater Hydrology. Hydrology of Basin Management Appendix. Index.

Latest Print 2014 / 356 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3707-7 / ₹ 325.00



#### Hydrology and Soil Conservation Engineering including Watershed Management, 2nd ed.



**GHANSHYAM DAS**, formerly Emeritus Fellow (AICTE) and Professor in Soil and Water Conservation Engineering, G.B. Pant University of Agriculture and Technology, Pantnagar.

Streamlined to facilitate student understanding, this second edition, containing the latest techniques and methodologies and some new problems, continues to provide a comprehensive treatment of hydrology of watersheds, soil erosion problems, design and installation of soil conservation practices and structures, hydrologic and sediment yield models, watershed management and water harvesting. It also deals with the special requirements of management of agricultural and forested watersheds.

This book is designed for undergraduate students of agricultural engineering for courses in hydrology, and soil and water conservation engineering. It will also be of considerable value to students of agriculture, soil science, forestry, and civil engineering.

#### FEATURES

- Emphasises fundamentals using numerous illustrations to help students visualise different phenomena
- Offers lucid presentation of field practices
- Presents the analysis and design of basic hydraulic structures
- Devotes an entire chapter to watershed management
- Provides numerous solved design problems and exercise problems to develop a clear understanding of the theory
- Gives theoretical questions, and objective type questions with answers to test the students' understanding.

**CONTENTS:** Preface. Introduction. Precipitation. Abstraction Losses. Stream Flow. Runoff. Frequency Analysis of Hydrologic Events. Hydrographs. Flood Routing. System, Conceptual and Dynamic Models of Runoff Hydrograph. Time Series Analysis. Soil Erosion. Controlling Soil Erosion. Water Harvesting. Watershed Management. Field Measurements: Runoff and Sediment Discharge. Appendices. Index.

Latest Print 2014 / 552 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3586-8 / ₹ 425.00



## ENGINEERING

Civil/Environmental (HYDROLOGY)

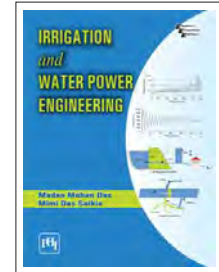
### Irrigation and Water Power Engineering

**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.

Designed primarily as a textbook for the undergraduate students of civil and agricultural engineering, this comprehensive and well-written text covers irrigation system and hydroelectric power development in lucid language.

The text is organized in two parts. Part I (Irrigation Engineering) deals with the methods of water distribution to crops, water requirement of crops, soil-water relationship, well irrigation and hydraulics of well, canal irrigation and different theories of irrigation canal design. Part II (Water Power Engineering) offers the procedures of harnessing the hydropotential of river valleys to produce electricity. It also discusses different types of dams, surge tanks, turbines, draft tubes, power houses and their components. The text emphasizes on the solutions of unsteady equations of surge tank and pipe carrying water to power house under water



hammer situation. It also includes computer programs for the numerical solutions of hyperbolic partial differential equations.

Besides undergraduate students, this book will also be of immense use to the postgraduate students of water resources engineering.

**CONTENTS:** Preface. Part I: Irrigation Engineering—Irrigation Engineering: An Introduction. Methods of Water Distribution to Crop Fields. Water Requirement of Crops and Soil Water Relationship. Well Hydraulics and Well Irrigation. Flow Irrigation. Canal Headworks. Cross Drainage Works. Canal Lining and Wasteland. Canal Fall. Design of Canal. Part II: Water Power Engineering—Water Power Engineering: An Introduction. Reservoirs. Dams: A General Introduction. Gravity Dam. Earth Dam and Arch Dam. Spillways. Intake Structures. Other Components of Water Power Plant. Unsteady Equations of Surge Tank: An Analysis. Water Hammer Pressure in Conduit Without a Surge Tank. Index.

Latest Print 2014 / 436 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-3587-5 / 395.00



## ENGINEERING

Civil/Environmental (MAINTENANCE)

### Maintenance, Repair and Rehabilitation and Minor Works of Buildings

**P.C. VARGHESE**, *Honorary Professor at Anna University, Chennai, was formerly Professor and Head, Department of Civil Engineering, IIT Madras.*

The term *Maintenance of a building* refers to the work done for keeping an existing building in a condition where it can perform its intended functions. Usually, the buildings last only for 40 to 50 years in a good shape just because of regular inspection and maintenance that enable timely identification of deteriorated elements. Overlooked dilapidation, inadequate maintenance and lack of repair works may lead to limited life span of a building. This comprehensive book, striving to focus on the maintenance, repair & rehabilitation and minor works of a building, presents useful guidelines that acquaint the readers with the traditional as well as modern techniques for upkeeping and repairing of buildings already constructed.

Dexterously organised into five parts, this book in Part I deals with the maintenance of buildings. Description of the construction chemicals, concrete repair chemicals, special materials used for repair, and repair of various parts of a building is given in Part II. Strengthening of reinforced concrete members by shoring, underpinning, plate bonding, RC jacketing and FRP methods are explored in Part III, which also highlights rebuilding of RC slabs and protection of earth slopes. Part IV of the book exposes the reader to the minor works done in a building such as construction of compound walls, gates, waters sumps, house garage, relaying of floors, joining two adjacent rooms and so on. Part V is based on some allied topics involving control on termites and fungus in buildings as well as introduction of Vaastu Shastra and its main recommendations for a single house in a plot.

Using an engaging style, this book will prove to be a must-read for the undergraduate and postgraduate students of civil engineering as well as for the polytechnic and ITI diploma students. Besides, the book will also be of immense benefit to the technical professionals across the country.

#### KEY FEATURES

- The text displays several figures to make the concepts clear.
- Chapter-end references make the text suitable for further study.
- Appendices at the end of the text provide extra information on non-destructive field tests for survey of the condition of concrete buildings and rough estimation of the construction and maintenance costs of buildings.

**CONTENTS:** Foreword. Preface. Acknowledgements. **Part I: Maintenance of Buildings**—General Comments about Maintenance of Buildings. Painting of Buildings.



Maintenance of Home Electricity System. Use of Solar and Wind Energy in Buildings. Maintenance of Domestic Water Pumps. **Part II: Repair and Rehabilitation**—Construction Chemicals. Concrete Repair Chemicals. Special Materials Used for Construction and Repair of Buildings. Mechanism of Corrosion of Steel in Reinforced Concrete. Repair of RC Slabs (i) RC Old Slabs with Bottom Falling Off Due to Steel Corrosion and (ii) New RC Slabs with Bottom Plaster Falling Off Due to Lack of Bond. Repair of RC Beams and Columns Damaged by Steel Corrosion. Repair of (i) Rising Dampness in Walls of Ground Floors in Old Buildings Constructed Without DPC (ii) Efflorescence in Buildings. Repair of Cracks in Masonry Walls of Buildings. Repair of Cracks in Concrete Members. Repair of Sunshades (Chajja). Repair of Rainwater Leakage in Buildings. Repair and Renovation of Waterproofing Works of RC Flat Roofs Against Rains. Repair of Valley Gutters of Sloping Roofs. Repair of Leakage of Basement Due to Groundwater. Repair of Leakage of Bathing Area of Toilets of Multistoreyed Buildings. Repair of Leakage of Sunken Floors of Toilets of Multistoreyed Buildings. **Part III: Strengthening of Members**—Strengthening Foundations of Buildings by Shoring and Underpinning. Strengthening RC Beams, Columns and Slabs by (i) Plate Bonding (ii) RC Jacketing and (iii) FRP Methods. Strengthening Columns and Beams by RC Jacketing. RC Slab Strengthening by Concrete Overlay. Protection of Earth Slopes. **Part IV: Minor Construction**—Construction and Repair of Underground Water Tanks with Weld Mesh and Overhead Water Tanks with Ferrocement. Construction of Rainwater Harvesting System. Construction of a Cantilever Portico (Car Porch). Construction of Compound Walls and Barbed Wire Fences. Fixing of Gates to Compound Wall. Fixing of Internal Doors without Door Frames. Construction of a Walkway on the Ground with Bricks. Construction of a House Garage. Relaying Floor with Ceramic Tiles. Converting the Brick Jelly Lime Concrete Roof into a Floor when One More Storey Added to the Building. Joining Two Adjacent Rooms by Removing the Load Bearing Wall in Between. **Part V: Allied Topics**—Control on Termites (White Ants) in Buildings. Fungus Decay of Timber in Buildings. Vaastu Shastra. **Appendices—A:** Non-destructive Field Tests for Survey of the Condition of Concrete in Buildings. **B:** Making a Rough Estimate of the Construction and Maintenance Costs of Buildings. Bibliography. Index.

Latest Print 2014 / 256 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4945-2 / 350.00

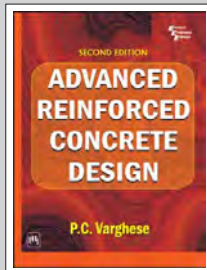


## ENGINEERING

Civil/Environmental (REINFORCED CONCRETE)

### Advanced Reinforced Concrete Design, 2nd ed.

**P.C. VARGHESE**, *Honorary Professor at Anna University, Chennai, was formerly Professor and Head, Department of Civil Engineering, IIT Madras.*



Intended as a companion volume to the author's *Limit State Design of Reinforced Concrete* (published by PHI Learning), the Second Edition of this comprehensive and systematically organized text builds on the strength of the first edition, continuing to provide a clear and masterly exposition of the fundamentals of the theory of concrete design. The text meets the twin objective of catering to the needs of the postgraduate students of Civil Engineering and the needs of the practising civil engineers as it focuses also on the practices followed by the industry.

This text, along with *Limit State Design*, covers the entire design practice of revised Code IS456 (2000). In addition, it analyzes the procedures specified in many other BIS codes such as those on winds, earthquakes, and ductile detailing.

Eminently suitable as a text for postgraduate students, the book can be used, by a judicious choice of topics, also for elective undergraduate courses. The practising engineers too would treasure it as a companion reference because of its practice-oriented approach and field applications.

**CONTENTS:** Preface. Preface to the First Edition. Acknowledgements. Introduction to IS 456 (2000). Deflection of Reinforced Concrete Beams and Slabs. Estimation of Crackwidth in Reinforced Concrete Members. Redistribution of Moments in Reinforced Concrete Beams. Design of Reinforced Concrete Deep Beams. Design of Ribbed (Voided) Slabs. Approximate Analysis of Grid Floors. Design Loads Other Than Earthquake Loads. Analysis of Reinforced Concrete Frames for Vertical Loads by Using Substitute Frames. Analysis of Frames under Horizontal Loads. Preliminary Design of Flat Slabs. Design of Two-way Slabs by Direct Design Method. Shear in Flat Slabs and Flat Plates. Equivalent Frame Analysis of Flat Slabs. Design of Spandrel (or Edge) Beams. Provision of Ties in Reinforced Concrete Slab-Frame System. Design of Reinforced Concrete Members for Fire Resistance. Design of Plain Concrete Walls. Earthquake Forces and Structural Response of Framed Buildings. Design of Shear Walls. Design of Cast *in Situ* Beams—Column Joints. Ductile Detailing of Reinforced Concrete Frames for Seismic Forces. Inelastic Analysis of Reinforced Concrete Beams and Frames. Strip Method of Design of Reinforced Concrete Slabs. Durability and Mix Design of Concrete. Quality Control of Concrete in Construction. Design of Structures for Storage of Liquids. Historical Development of Reinforced Concrete. Appendices. Index.



Latest Print 2014 / 560 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2787-0 / ₹ 395.00

PHI Learning: Publications

### Design of Reinforced Concrete Foundations



**P.C. VARGHESE**, *Honorary Professor at Anna University, Chennai, was formerly Professor and Head, Department of Civil Engineering, IIT Madras.*

A companion volume to the author's *Foundation Engineering* (published by PHI Learning), this comprehensive and well-organized text deals with the structural design of the commonly used types of reinforced concrete foundations. It explains step-by-step procedure for the design of each type of foundation with the help of a large number of worked-out examples. The book provides an in-depth analysis of topics, such as wall footings, balanced footings, raft foundations, beam and slab rafts, pile caps and pile foundations.

The book is designed as a textbook for the undergraduate and postgraduate students (Structural/Geotechnical) of Civil Engineering. As the book deals with both the fundamentals of the subject and field practice, practising engineers will also find the book very useful.

**CONTENTS:** Preface. Acknowledgements. Foundation Structures. Review of Limit State Design of Reinforced Concrete. IS 456 Provisions for Design of Footings and Pedestals. Design of Centrally Loaded Isolated Footings and Column Pedestals. Wall Footings. Design of Isolated Footings with Vertical Loads and Moments. Combined Footings for Two Columns. Balanced Footings. Strip Footings under Several Columns. Raft Foundations. Design of Flat Slab Rafts—Mat Foundations. Beam and Slab Rafts. Compensated Foundations, Cellular Rafts and Basement Floors. Combined Piled Raft Foundation (CPRF). Circular and Annular Rafts. Under-reamed Pile Foundations. Design of Pile Caps. Pile Foundations—Design of Large Diameter Socketed Piles. Design of Cantilever and Basement Retaining Walls. Infilled Vierendeel Frame Foundations. Steel Column Bases. Analysis of Flexible Beams on Elastic Foundation. ACI Method for Analysis of Beams and Grids on Elastic Foundations. Analysis of Flexible Plates on Elastic Foundations. Shells for Foundations. Hyperbolic Paraboloid (Hypar) Shell Foundation. Design of Conical Shell Foundation. Effect of Earthquakes on Foundation Structures. Appendices—A: Geotechnical Data. B: Extracts from SP 16 for Design of Reinforced Concrete Members. C: Steel Reinforcement Data. D: Design Charts of Centrally Loaded Columns and Footings. Bibliography. Index.

Latest Print 2013 / 456 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3615-5 / ₹ 425.00

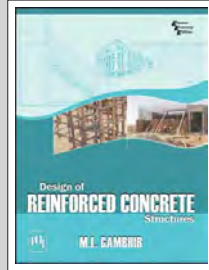




## ENGINEERING

Civil/Environmental (REINFORCED CONCRETE)

### Design of Reinforced Concrete Structures



**M.L. GAMBHIR**, former Professor and Head of Civil Engineering Department, and Dean (Planning and Resource Generation) at the Thapar Institute of Engineering and Technology, Patiala.

Designed primarily as a text for the undergraduate students of civil engineering, this compact and well-organized text presents all the basic topics of reinforced concrete design in a comprehensive manner. The text conforms to the limit states design method as given in the latest revision of Indian Code of Practice for Plain and Reinforced Concrete, IS : 456 (2000).

This book covers the applications of design concepts and provides a wealth of state-of-the-art information on design aspects of wide variety of reinforced concrete structures. However, the emphasis is on modern design approach. The text attempts to:

- Present simple, efficient and systematic procedures for evolving design of concrete structures.
- Make available a large amount of field tested practical data in the appendices.
- Provide time saving analysis and design aids in the form of tables and charts.
- Cover a large number of worked-out practical design examples and problems in each chapter.
- Emphasize on development of structural sense needed for proper detailing of steel for integrated action in various parts of the structure.

Besides students, practicing engineers and architects would find this text extremely useful.

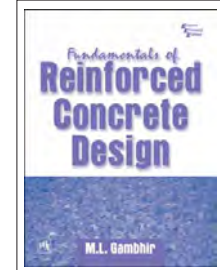
**CONTENTS:** Preface. Basic Principles of Reinforced Concrete Design. Design of Staircases. Design of Slabs. Flat Slabs. Yield Line Theory for Slabs. Special Structural Elements. Building Frames. Design of Foundations. Retaining Walls. Water Tanks. Appendices—AI: Gravity Loads. AII: Seismic Loads. AIII: Wind Loads. B: Resultant Design Forces. C: Design Aids. D: Column-Interaction Curves. E: Steel Properties—Reinforcement. F: Units Conversion Factors. G: References. Index.

Latest Print 2013 / 740 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3193-8 / ` 475.00



### Fundamentals of Reinforced Concrete Design



**M.L. GAMBHIR**, formerly, Professor and Head of Civil Engineering Department, and Dean (Planning and Resource Generation) at the Thapar Institute of Engineering and Technology, Patiala.

Designed primarily as a text for undergraduate students of Civil Engineering for their first course on Limit State Design of Reinforced Concrete, this compact and well-organized text covers all the fundamental concepts in a highly readable style. The text conforms to the provision of the latest revision of Indian Code of Practice for Plain and Reinforced Concrete, IS : 456 (2000).

First six chapters deal with fundamentals of limit states design of reinforced concrete. The objective of last two chapters (including design aids in appendix) is to initiate the readers in practical design of concrete structures. The text gives detailed discussion of basic concepts, behaviour of the various structural components under loads, and development of fundamental expressions for analysis and design. It also presents efficient and systematic procedures for solving design problems. In addition to the discussion of basis for design calculations, a large number of worked-out practical design examples based on the current design practices have been included to illustrate the basic principles of reinforced concrete design.

Besides students, practising engineers would find this text extremely useful.

**CONTENTS:** Preface. Introduction to Reinforced Concrete. Design Principles. Limit State of Collapse: Flexure. Limit State of Collapse: Shear, Bond and Torsion. Limit State of Collapse: Compression. Limit State of Serviceability. Design of Key Building Elements. Detailing The Reinforcement. Appendices: A: Working Stress Design Method. B: Gravity Loads. C: Design Forces. D: Design Aids. E: Steel Properties: Reinforcement. F: References. Index.

Latest Print 2014 / 536 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3048-1 / ` 395.00



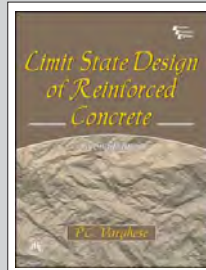
## ENGINEERING

Civil/Environmental (REINFORCED CONCRETE)

Civil/Environmental (SOIL ENGINEERING)

### Limit State Design of Reinforced Concrete, 2nd ed.

**P.C. VARGHESE**, *Honorary Professor at Anna University, Chennai, was formerly Professor and Head, Department of Civil Engineering, IIT Madras.*



This substantially revised second edition takes into account the provisions of the revised Indian Code of practice for Plain and Reinforced Concrete IS 456 : 2000. It also provides additional data on detailing of steel to make the book more useful to practicing engineers. The chapter on Limit State of Durability for Environment has been completely revised and the new provisions of the code such as those for design for shear in reinforced concrete, rules for shearing main steel in slabs, lateral steel in columns, and stirrups in beams have been explained in detail in the new edition.

This comprehensive and systematically organized book is intended for undergraduate students of Civil Engineering, covering the first course on Reinforced Concrete Design and as a reference for the practicing engineers. Besides covering IS 456 : 2000, the book also deals with the British and US Codes. Advanced topics of IS 456 : 2000 have been discussed in the companion volume *Advanced Reinforced Concrete Design* (also published by PHI Learning). The two books together cover all the topics in IS 456 : 2000 and many other topics which are so important in modern methods of design of reinforced concrete.

**CONTENTS:** List of Illustrations. List of Tables. Foreword. Preface. Preface to the First Edition. Acknowledgements. Introduction to IS 456 (2000). Introduction to Limit State Design. Methods of Design of Concrete Structures. Partial Safety Factors in Limit State Design. Limit State of Durability of Reinforced Concrete to Environment. Theory of Singly Reinforced Members in Bending (Limit State of Collapse—Flexure). Examples in Design and Analysis of Singly Reinforced Beams. Design of Doubly Reinforced Beams. Limit State of Collapse in Shear (Design for Shear). Design of Flanged Beams. Design of Bending Members for Serviceability Requirements of Deflection and Cracking. Bond, Anchorage, Development Lengths and Splicing. Design of One-way Slabs. Design of Two-way Slabs. Limit State of Collapse in Compression Design of Axially Loaded Short Columns. Design of Short Columns with Moments. Effective Length of Columns. Design of R.C. Slender Columns. Design of Concrete Walls Carrying Vertical Loads. Design for Torsion. Design of R.C. Members in Tension. Design of Staircases. Design of Corbels, Brackets and Nibs. Design of Footings, Pedestals and Pile Caps. Appendices—A: Working Stress Method of Design. B: General Data for Designs. C: Formulae for Some Charts and Tables in IS 456. D: Standard Method of Detailing R.C. Beams and Slabs. Index.

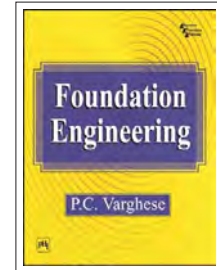
Latest Print 2013 / 580 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2039-0 / 350.00



PHI Learning: Publications

### Foundation Engineering

**P.C. VARGHESE**, *Honorary Professor at Anna University, Chennai, was formerly Professor and Head, Department of Civil Engineering, IIT Madras.*



Unlike many textbooks on Geotechnical Engineering that deal with both Soil Mechanics and Foundation Engineering, this text gives an exclusive treatment and an in-depth analysis of Foundation Engineering. It provides a solid foundation for further practice in their profession later. In addition, as the book is based on the Codes prescribed by the Bureau of Indian Standards, students of Indian universities will find it particularly useful. Intended as a text for undergraduate (Civil Engineering) and postgraduate (Geotechnical Engineering and Structural Engineering) students, the book would also be found highly useful to practising engineers and young academics teaching the course.

The author is specialized in both Soil Mechanics and Structural Engineering; he studied Soil Mechanics under the guidance of Prof. Terzaghi and Prof. Casagrande of Harvard University—the pioneers of the subject. Similarly, he studied Structural Engineering under Prof. A.L.L. Baker of Imperial College, London, the pioneer of Limit State Design.

**CONTENTS:** Preface. Acknowledgements. Introduction. Units. Engineering Properties of Soils. Contact Pressures on Base of Footings. Stress Distribution in Soils. Settlement of Foundations. General Requirement of Shallow and Deep Foundations. Bearing Capacity of Shallow Foundations. Factors Affecting Bearing Capacity of Shallow Foundations. Design of Raft Foundations. Load Carrying Capacity of Piles by Static Formulae. Load Carrying Capacity of Piles by Dynamic Formulae. Structural Design of Concrete Piles. Construction of Cast in-situ Piles. Group Action and Lateral Resistance of Vertical Piles. Field Tests on Piles. Piled Raft Foundations. Lateral Earth Pressures on Rigid Walls. Effect of Superimposed Loads on Backfill and Empirical Design of Retaining Walls. Floating Foundations. Foundations for Steel Towers and Chimneys. Well Foundations. Foundation on Shrinking (Expansive) Soils. Flexible Retaining Structures—Sheet Pile Walls and Braced Excavations. Design of Machine Foundations. Stability of Slopes. Ground Improvement Techniques. Reinforced or Mechanically Stabilized Earth (MSE). Soil Exploration—Geological Investigation of Sites. Site and Soil Investigation Reports. Appendices—A: Determination of Contact Pressure Distribution in Soils and Analysis of Beams on Elastic Foundations by Influence Charts. B: ACI Method for Analysis of Beams and Grids on Elastic Foundations. C: Analysis of Flexible Plate on Elastic Foundations. D: Cyclic Load Tests and Estimation of Settlement in Piles. E: Building Foundations in Theory and Practice. Index.

Latest Print 2014 / 512 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2652-1 / 425.00



## ENGINEERING

Civil/Environmental (REINFORCED CONCRETE)

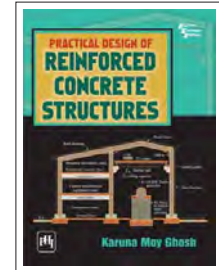
### Practical Design of Reinforced Concrete Structures

**KARUNA MOY GHOSH**, *Formerly Chief Structural Engineer with Kaiser Engineers and Constructors, Inc., and Mott MacDonald Group.*

This book is a comprehensive presentation of the practical aspects of analysis and design of reinforced concrete structures. Written on the basis of the British (BS) and European (Eurocode) codes of practices, this book is primarily meant for the undergraduate students of civil engineering. It will also be highly useful for structural engineers working in the fields of design, consultancy and construction involving reinforced concrete structures.

The text is organized into four parts, each dealing with the analysis and design of a specific type of reinforced concrete structure. The first part covers the multi-storeyed administrative/office building. The second part deals with the elevated storage bin structure used in steel plants. The elevated structural framework subjected to mechanical vibration is the subject matter of the third part. The fourth and final part discusses the precast reinforced concrete workshop building. The important activities required to be carried out prior to structural analysis—structural arrangement planning, materials selection, examination of buildability and environmental impact—are covered in the initial chapters in each part. This is followed by a step-by-step presentation of the analysis and design procedures for various structures and structural elements/members.

The book presents the various structural analyses and design calculations in an exhaustive manner. The text is illustrated with a large number of visuals. Important additional information relevant to this field can be found in the



references provided at the end of various chapters. The STRAP structural analysis program for the multi-storeyed administrative/office building, and the vibration analysis of the elevated reinforced concrete framed structure, are provided in the Annexures to the book.

**CONTENTS:** Preface. Part 1: Multistoreyed Administrative/Office Building—General Principles and Practices. Analysis and Design of Slabs. Analysis and Design of Secondary Longitudinal Beams. Analysis and Design of Main Structural Frame. Basement Structure. Part 2: Reinforced Concrete Elevated Storage Bin Structure for Limestone and Coke in Steel Plant Project—General Principles and Practices. Foundations and Geotechnics. Design Concept. Analysis and Design of Structural Elements. Part 3: Elevated Reinforced Concrete Structure Subjected to Machine Vibrations Induced by Turbo-Generator—General Principles and Practices. Geotechnics of Soil Related to Vibration Induced by Turbo-generator. Foundation of Elevated Structural Framework to Support Turbo-generator. Analysis and Design of Elevated Structural Framework to Support Turbo-generator. Part 4: Precast Reinforced Concrete Workshop Building—General Principles and Practices. Design Data and Specification. Analysis of Structural Frame. Design of Structural Frame. Annexures—A: STRAP Structural Analysis Programs for Analysis of Multistoreyed Administrative/Office Building. B: Vibration Analysis of Elevated RC Framed Structure to Support 10 MW Turbo-generator. Index.

Latest Print 2013 / 276 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4028-2 / ₹ 250.00



## ENGINEERING

Civil/Environmental (ROCK MECHANICS)

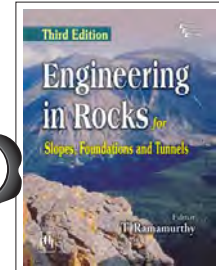
### Engineering in Rocks for Slopes, Foundations and Tunnels, 3rd ed.

**Editor:** T. RAMAMURTHY, former Professor of civil engineering, served and taught at the Indian Institute of Technology (IIT) Delhi.

With the ever-increasing developmental activities as diverse as the construction of dams, roads, tunnels, underground powerhouses and storage facilities, petroleum exploration and nuclear repositories, a more comprehensive and updated understanding of rock mass is essential for civil engineers, engineering geologists, geophysicists, and petroleum and mining engineers. Though some contents of this vast subject are included in under-graduate curriculum, there are full-fledged courses on Rock Mechanics/Rock Engineering in postgraduate programmes in civil engineering and mining engineering. Much of the material presented in this book is also taught to geology and geophysics students. In addition, the book is suitable for short courses conducted for teachers, practising engineers and engineering geologists.

This book, with contributions from a number of authors with expertise and vast experience in various areas of rock engineering, gives an in-depth analysis of the multidimensional aspects of the subject. The text covers a wide range of topics related to engineering behaviour of rocks and rock masses, their classifications, interpretation of geological mapping of joints through stereographic projection, in situ stress measurements, laboratory and field tests, stability of rock slopes, foundations of structures, including dams and support systems for underground excavations.

The **Third Edition** of the book is further enriched with the addition of a number of case histories in which the analyses and designs were carried out by adopting rock mass parameters as per RMR, Q or GSI. The consequence of such an approach is critically examined. With the adoption of parameters from joint factor, excellent performance prediction has been demonstrated for anisotropic rocks and tunnel. Various expressions developed for  $K_n$  and  $K_s$  for different conditions are included for adoption in numerical analyses. When dilatancy component is separated, the scale



effect on shear response is insignificant. This edition provides a comprehensive understanding of rock mass response and enables students to tackle rock engineering problems more confidently and realistically, and therefore it will be of immense benefit to students, teachers, professionals and designers alike.

**CONTENTS:** Preface. Historical Development of Rock Mechanics—*T. Ramamurthy*. Basic Equations from Solid Mechanics—*K.G. Sharma & A. Varadarajan*. Distribution of Rocks on Indian Mainland—*T. Ramamurthy*. Stereographic Presentation of Geological Data—*T. Ramamurthy*. Laboratory Testing of Rocks—*T. Ramamurthy*. Strength, Modulus and Stress-Strain Responses of Rocks—*T. Ramamurthy*. Engineering Classification of Rocks and Rock Masses—*T. Ramamurthy*. In Situ Geophysical Methods—*N. Ghosh*. Electrical Resistivity Method for Ground Characterization—*J.M. Kate*. Deformability Tests in Rock Mass—*Rajbal Singh*. Field Shear Test—*Rajbal Singh*. Hydraulic Fracture Method to Determine in Situ Stresses—*S. Sengupta*. Field Permeability Test—*T. Ramamurthy*. Estimation of Stresses in Rock Mass—*T. Ramamurthy*. Stability of Rock Slopes—*T. Ramamurthy*. Rock Foundations—*T. Ramamurthy*. Closed Form Solutions for Underground Openings—*T. Ramamurthy*. Convergence Confinement Analysis—*T. Ramamurthy*. Rock Loads from Empirical Methods—*T. Ramamurthy*. Design of Supports—Empirical Approaches—*T. Ramamurthy*. Numerical Methods and Applications—*A. Varadarajan & K.G. Sharma*. Equivalent continuum Modelling of Jointed Rock Mass—*T.G. Sitharam*. Geomechanical Modelling and Application—*K.K. Gupta & A.H. Ghazvinian*. Drilling and Blasting for Underground and Open Excavations—*Rajiv Badal*. Roadheader Selection for Tunnelling—*Rajiv Badal*. Application of Tunnel Boring Machines—*Rajiv Badal*. Shotcreting, Including Some Case Histories—*U.S. Rajvanshi*. Methods to Improve Rock Mass Responses—*T. Ramamurthy*. Miscellaneous Books on the Subject. About the Contributing Authors. Index.

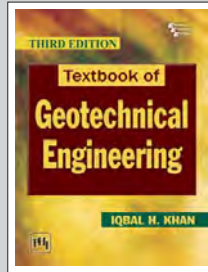
Latest Print 2014 / 784 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4879-0 / 650.00



## ENGINEERING

### Civil/Environmental (SOIL ENGINEERING)

#### Textbook of Geotechnical Engineering, 3rd ed.



**IQBAL H. KHAN**, *Professor Emeritus in the Department of Civil Engineering, Jamia Millia Islamia, New Delhi.*

This revised Third Edition is a result of the positive feedback and constructive suggestions received from academics and students alike on the second edition. It also reflects the many years of teaching experience of the author as also his experience in research and consultancy on the subject.

While retaining the major contents of the earlier editions, the book consolidates on the subject, bringing in new areas of interest and concern.

#### What is new to this edition:

- A new chapter covering various geotechnical aspects of Earthquakes.
- All computer programs have been upgraded.

This text, which skillfully integrates theory and practice, would be suitable as a textbook for undergraduate students of civil engineering. The book can also be used, by a judicious choice of topics, by polytechnic students. In addition, practicing engineers would find the text very useful.

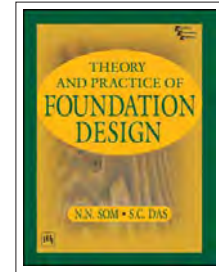
#### KEY FEATURES

- Contains plenty of worked-out numerical examples.
- Gives a large number of Objective Type Questions and Exercises.
- Analyzes field problems and case histories.
- Makes the book accessible and interesting by logical organization and presentation of topics.

**CONTENTS:** Preface. Physical Properties of Soils. Water in Soils. Stresses in Soils. Consolidation and Settlement. The Shear Strength of Soils. Shallow Foundations. Site Investigation and Soil Improvement. Deep Foundations. The Stability of Slopes. Earth Pressure. Sheet-Pile Walls. Foundations for Machines. Environmental Geotechnology. Earthquakes: Geotechnical Aspects. Appendix—Site Investigation Report. Bibliography. Multiple-Choice Questions. Answers. Index.

**Latest Print 2013 / 508 pp. / 16.0 × 24.1 cm**  
**ISBN-978-81-203-4510-2 / ₹ 375.00**

#### Theory and Practice of Foundation Design



**N.N. SOM**, *former Professor of Civil Engineering, Jadavpur University, Kolkata.*

**S.C. DAS**, *former Professor of Civil Engineering, Jadavpur University, Kolkata.*

This comprehensive text on foundation design is intended to introduce students of civil engineering, architecture, and environmental disciplines to the fundamentals of designing sound foundations and their implementation. It offers an in-depth coverage of pre- and post-design methodologies that include soil identification, site investigation, interpretation of soil data and design parameters, foundations on different soil types through to settlements, seismic responses, and construction concerns.

Supported by the abundance of real-world events/situations and examples that help students master the text concepts, this volume becomes an incisive text and reference guide.

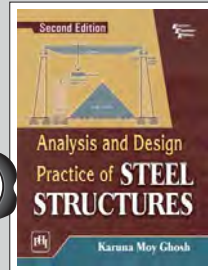
**CONTENTS:** Soil as an Engineering Material. Site Investigation. Soil Data and Design Parameters. Foundations: Types and Design Criteria. Stress Distribution in Soils. Bearing Capacity of Shallow Foundations. Settlement Analysis. Footings and Raft Design. Pile Foundations. Well Foundations. Foundations on Expansive Soils. Ground Improvement Techniques. Earthquake Response of Soils and Foundations. Construction Problems.

**Latest Print 2013 / 392 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-2190-8 / ₹ 295.00**

## ENGINEERING

### Civil/Environmental (STEEL DESIGN)

#### Analysis and Design Practice of Steel Structures, 2nd ed.



**KARUNA MOY GHOSH**, formerly Chief Structural Engineer, Kaiser Engineers and Constructors, Inc. and also with Mott MacDonald Group (London) and W.S. Atkins and Partners (India).

This book is a comprehensive presentation of the fundamental aspects of analysis and design of steel structures. It is primarily meant for the undergraduate students of civil engineering and postgraduate students of structural engineering. It will also be immensely useful for structural engineers engaged in design, consultancy and construction involving steel structures.

The important theoretical and practical concepts which need to be assimilated prior to undertaking analysis and design—general principles and practices, functional aspects of structures, basic design concepts, alternative arrangements of equipment and service, clarity of structural behaviour, and calculations of loadings on structures—are covered in the first two chapters. The ensuing chapters provide stepwise presentation of the analysis and design procedures for various steel structures and structural elements/members on the basis of Eurocodes and British (BS) codes of practice. The three types of structures specifically covered, on the basis of functional aspects, are scrap yard structures, conveyor structural systems, and turbo-generator buildings.

In the **Second Edition**, analysis and design of steel structures have been carried out based on Indian Standard code of practice IS 800:2007. Every component of the structure comprising the beams and columns is designed in compliance with the code IS 800:2007. A comparison has been made between the results of the steel structures analysed and designed in compliance with EC3: Part 1-1 and those obtained in accordance with Indian Standard code of practice IS 800:2007.

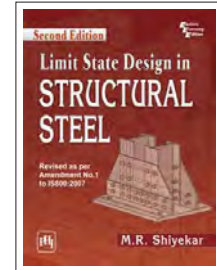
The book discusses the various structural analyses and design calculations in an exhaustive manner. The text is illustrated with an abundant number of visuals. Important sources of information relevant to steel structures can be found in the references at the end of various chapters.

**CONTENTS:** Preface. Design Philosophy and Practices. Design Data, Stresses, and Bolts and Weld Connections. Scrap Yard Structures. Conveyor Structural System from HBI (Heavy Briquette Iron) Building to Mill Building. A Turbo-Generator Building. Annexure A: Tables and Curves Based on EC3: Part 1-1. Annexure B: Annex A of Indian Standard Code of Practice IS 800:2007 General Construction in Steel. Index.



Latest Print 2014 / 312 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4937-7 / 350.00

#### Limit State Design in Structural Steel, 2nd ed.



**M.R. SHIYEKAR**, former Principal and Professor in Structural Engineering, Pune.

The second edition has incorporated all the revisions necessitated after the issue of Amendment No. 1 of January 2012 to IS 800:2007.

The book is primarily designed for the students of civil/structural engineering at all levels of studies—undergraduate, postgraduate and diploma—as well as for the professionals in the field of structural steel design. It covers the fundamental concepts of steel design in the perspective of the limit state design concept as per IS 800:2007, with the focus on cost-effective design of industrial structures, foot bridges, portal frames, and pre-engineered buildings. The connection design details are discussed concurrently with the design of members.

The book covers the subject matter, with the help of numerous practical illustrations accompanied by step-by-step design calculations and detailing, in 14 chapters—including a chapter on pre-engineered buildings.

Solved examples as well as exercises are provided in each chapter to enable the development of a strong understanding of the underlying concepts and for testing the comprehension acquired by the students. The geometrical properties of rolled steel sections, often required as per the revised clauses of IS 800:2007 and not appearing in the existing steel tables, are given in the Appendix A for ready reference.

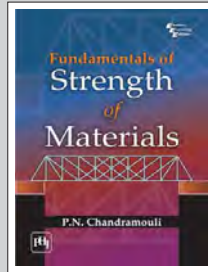
**CONTENTS:** Preface. Preface to the First Edition. Acknowledgements. Introduction. Philosophy of Limit State Design. Tension Members. Compression Members. Plastic Analysis. Flexural Members—Laterally Supported. Flexural Members—Laterally Unsupported. Beam-Column. Plate Girder. Column Bases. Portal Frames. Industrial Structures. Foot Bridge. Pre-Engineered Buildings. Appendices. Bibliography. Index.

Latest Print 2013 / 420 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4784-7 / 450.00

## ENGINEERING

### Civil/Environmental (STRENGTH OF MATERIALS)

#### 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.

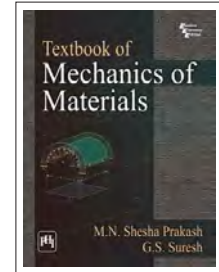
**CONTENTS:** Preface. Stresses and Strains. Compound Stresses. Shear Force and Bending Moment. Trusses and Cables. Centroid and Centre of Gravity. Moment of Inertia. Bending and Shear Stresses in a Beam. Torsion in Circular Shaft. Deflection of Beams. Columns and Struts. Thin and Thick Cylinders. Testing of Materials. Bibliography. Index.

Latest Print 2013 / 864 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-4672-7 / ₹ 525.00



#### 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

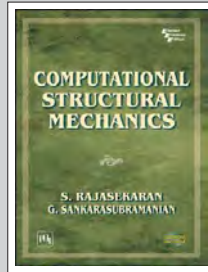
ISBN-978-81-203-4185-2 / ₹ 275.00



## ENGINEERING

Civil/Environmental (STRUCTURAL ANALYSIS)

### Computational Structural Mechanics (with CD-ROM)



**S. RAJASEKARAN**, Professor Emeritus, Department of Civil Engineering, PSG College of Technology, Coimbatore.

**G. SANKARASUBRAMANIAN**, Assistant Professor, both of Department of Civil Engineering, PSG College of Technology, Coimbatore.

This class-room tested book, representing the teaching experience of over two decades by the authors, is designed to cater to the needs of senior undergraduate and first-year postgraduate students of civil engineering for a course in Advanced Structural Analysis/Matrix Methods of Structural Analysis/Computer Methods of Structural Analysis.

The book endeavours to fulfil two principal objectives. First, it acquaints students with the matrix methods of structural analysis and their underlying concepts and principles. Second, it demonstrates the development of well-structured computer programs for the analysis of structures by the matrix methods.

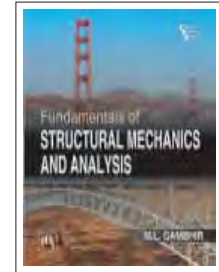
A large number of worked-out examples are included to amplify the concepts and to illustrate the effect of external loads, including the effect of temperature, lack of fit, and settlement of supports, etc. The CD-ROM contains many illustrative computer programs and the usage of modern packages such as Excel and Matlab.

The book will also be a useful reference for practising structural engineers who wish to pursue the versatility of matrix methods as a tool for computer applications.

**CONTENTS:** Foreword. Preface. Introduction. Degree of Kinematic Indeterminacy. Degree of Static Indeterminacy. Fundamental Concepts of Structures. Energy Concepts in Structural Analysis. Relationship between Element and System. Equations of Statics and Kinematics. Flexibility Method. Stiffness Approach. Direct Stiffness Method. Matrix Displacement Method: Special Topics. Buckling and Dynamic Analysis: The Eigenvalue Problems. References. Index.

Latest Print 2012 / 796 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-1734-5 / ₹ 450.00

### Fundamentals of Structural Mechanics and Analysis



**M.L. GAMBHIR**, has been Professor and Head of Civil Engineering Department, and Dean of Planning and Resource Generation, at Thapar University, Patiala.

This book is a comprehensive presentation of the fundamental aspects of structural mechanics and analysis. It aims to help develop in the students the ability to analyze structures in a simple and logical manner. The major thrust in this book is on energy principles.

The text, organized into sixteen chapters, covers the entire syllabus of structural analysis usually prescribed in the undergraduate level civil engineering programme and covered in two courses. The first eight chapters deal with the basic techniques for analysis, based on classical methods, of common determinate structural elements and simple structures. The following eight chapters cover the procedures for analysis of indeterminate structures, with emphasis on the use of modern matrix methods such as flexibility and stiffness methods, including the finite element techniques.

Primarily designed as a textbook for undergraduate students of civil engineering, the book will also prove immensely useful for professionals engaged in structural design and engineering.

#### KEY FEATURES

- More than 200 worked out examples illustrating the basic principles and solution techniques help students assimilate the underlying principles.
- More than 300 chapter-end exercises, with answers in many cases, test the students' grasp of the fundamental concepts.
- Numerous well-labelled diagrams provided throughout the book lead to easy learning.
- Important additional materials in the appendices allow quick reference by the readers.

**CONTENTS:** Preface. Structures: An Introduction. Basic Concepts and Analysis Tools. Cables and Suspension Bridges. The Plane Trusses. Three-dimensional Space Trusses. Analysis of Arches. Influence Lines and Rolling Loads. Elastic Deflections. An Introduction to Statically Indeterminate Structures. Flexibility Method (Force or Consistent Deformation Method). Force-Displacement Methods (Slope-Deflection, Three-moment Equations, Moment Distribution and Stiffness Methods). System Approach. Moment Distribution. Direct Stiffness Method. An Introduction to Finite Element Method. Approximate Analysis of Indeterminate Structures. Appendices—A: Review of Matrix Algebra. B: Shear Force, Bending Moment Diagrams and Deflection Formulae. Bibliography. Index.

Latest Print 2014 / 924 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4236-1 / ₹ 595.00





## Matrix Methods of Structural Analysis

**P.N. GODBOLE**, *Professor Emeritus at RCOEM Nagpur.*

**R.S. SONPAROTE**, *Associate Professor, Department of Applied Mechanics, Visvesvaraya National Institute of Technology (VNIT), Nagpur.*

**S.U. DHOTE**, *Assistant Professor, Department of Civil Engineering, Yeshwantrao Chavan College of Engineering (YCCE), Nagpur.*

The book describes in great detail the Matrix Methods of Structural Analysis used extensively for the analysis of skeletal or framed structures. The book gives complete coverage to the subject starting from the basics. It is organized in four parts:

- Part 1 contains basic knowledge required to understand the subject i.e. Matrix operations, Methods for solving equations and concepts of flexibility matrix and stiffness matrix methods.
- Part 2 deals with the applications of stiffness and flexibility matrix methods using system approach. By taking simple examples, the steps involved in both the methods are discussed and it is concluded why stiffness matrix method is more suitable for analysis of skeletal structures.
- Part 3 covers the Stiffness matrix (displacement) method with member approach (direct Stiffness method) which is extensively used in the analysis of framed structures. It gives the details of the method, the steps involved in the method and its application to plane truss, space truss, beams, plane and space frames and grids.



- Part 4 includes a unified computer program written in FORTRAN/C for the analysis of framed structure. The development of computer program, explanation of various subroutines, input output formats with examples is given in this section. An accompanying CD with the book contains source code, explanation of INPUT/OUTPUT and test examples.

Though, the concepts have been presented in quite general form so that the book serves as a learning aid for students with different educational backgrounds as well as the practicing engineers, the primary objective is to present the subject matter in a simple manner so that the book can serve as a basic learning tool for undergraduate and postgraduate students of civil engineering.

**CONTENTS:** Preface. Introduction. Part 1: Basics—Matrix Algebra. Solution of Equations. Stiffness and Flexibility. Part 2: Structure (System) Approach—Flexibility Matrix Method. Stiffness Matrix Method. Part 3: Stiffness Matrix Method: Member Approach—Basic Steps of Stiffness Method. Beams. Plane Truss. Plane Frames. Grids. Space Trusses and Space Frames. Additional Topics. Part 4: Educational Program—Computer Program and Illustrative Examples. **Appendices**—A: Methods to Find Deflections. B: Slopes and Deflections in Beams. C: Fixed End Forces in Beams. D: Properties of Plane Areas. Index.

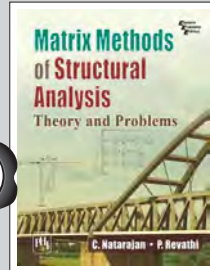
Latest Print 2014 / 320 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4984-1 / ₹ 375.00



## ENGINEERING

Civil/Environmental (STRUCTURAL ANALYSIS)

### Matrix Methods of Structural Analysis: Theory and Problems



**C. NATARAJAN**, Professor, Department of Civil Engineering, National Institute of Technology, Tiruchirappalli.

**P. REVATHI**, Assistant Professor, Department of Civil Engineering, Pondicherry Engineering College, Puducherry.

Designed as a textbook for the undergraduate students of civil engineering and postgraduate students of structural engineering, this comprehensive book presents the fundamental aspects of matrix analysis of structures. The basic features of Matrix Structural Analysis along with its intricacies in application to actual problems backed up by numerical examples, form the main objective of writing this book.

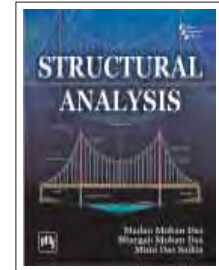
The text begins with the chapters on basics of matrices and structural systems. After providing the foundation for matrix structural representation, the text moves onto dimensional and behavioral aspects of structural systems to classify into pin-jointed systems, then onto beams and finally three-dimensional rigid jointed systems. The text concludes with a chapter on special techniques in using matrices for structural analysis. Besides, MATLAB codes are given at the end to illustrate interfacing with standard computing tool. A large number of numerical examples are given in each chapter which will reinforce the understanding of the subject matter.

**CONTENTS:** Foreword. Preface. Basic Concepts. Determinants and Matrices. Flexibility and Stiffness Characteristics of Structures. Transformation Matrices. Concepts in Matrix Methods of Analysis. Analysis of Pin Jointed Frames. Analysis of Continuous Beams. Analysis of Rigid Jointed Frames. Special Topics and Techniques. Appendices—A: Slope and Rotations. B: Fixed End moments. C: Sample MATLAB code for Flexibility Method. D: Sample MATLAB code for Stiffness Method. Index.



Latest Print 2014 / 488 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4900-1 / ` 395.00

### Structural Analysis



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

**BHARGAB MOHAN DAS**, Chief Business Development Officer, Executive Project Coordinator and Chairperson of Green Building Division, Ritta Co., Ltd., Thailand.

**MIMI DAS SAIKIA**, Professor, Civil Engineering Department, Assam Down Town University, Guwahati.

Intended as a textbook for the undergraduate students of civil engineering, this book covers the complete syllabi of two courses in theory of structural analysis taught to the engineering students in third and fourth semesters.

The book is organised in two parts—Part I (for the third semester course) and Part II (for the fourth semester course). It covers all the important topics such as bending moment and shear force diagrams for statically determinate beams, analysis of statically determinate structures, relation between curvature, slope and deflection of beams, Castiglione's theorem, Macaulay's method, analysis of fixed and continuous beams, Girder bridge and retaining walls.

#### KEY FEATURES

1. Numerous worked-out examples in each and every chapter.
2. Step-by-step derivations of equations.
3. Review Questions and Problems to sharpen the problem-solving skills.

**CONTENTS:** Preface. **Part I**—Bending Moment and Shear Force Diagrams for Statically Determinate Beams. Analysis of Statically Determinate Structures. Work-Energy Principle. Slope and Deflection of Beams. Deflection of Perfect Frames. Columns. Conjugate Beam Method. **Part II**—Fixed Beams. Continuous Beam. Two-hinged Arches. Indeterminacy of Structures. Moment Distribution Method. Suspension Girder Bridge. Masonry Dams and Retaining Walls. Index.

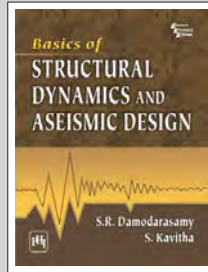
Latest Print 2011 / 352 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4309-2 / ` 325.00

## ENGINEERING

Civil/Environmental (STRUCTURAL DYNAMICS)

### Basics of Structural Dynamics and Aseismic Design

**S.R. DAMODARASAMY**,  
*Principal of Government College of Engineering, Salem.*  
**S. KAVITHA**, *Assistant Engineer in the Highways Department, Government of Tamil Nadu, Erode.*



This book covers all the four major areas of Earthquake Engineering such as Structural Dynamics, Seismology, Seismic Analysis, Aseismic Design, including design philosophy, capacity design and codal provisions. It also provides detailed information on liquefaction of soil and effects of soil properties on response spectra. Each chapter is well-designed and well-balanced with lucid illustrations and diagrams. Numerous solved examples have been included for better comprehension of the concepts. Exercises with answers have been provided at the end of each chapter to develop problem-solving skills of the students.

This comprehensive survey of the effects of earthquakes on dynamics of structures and their aseismic design is intended for B.E./B.Tech. students of Civil Engineering and M.E./M.Tech. students of Structural Engineering.

#### SALIENT FEATURES

- The concepts and theories of earthquake engineering are presented in a lucid manner, with ample discussions and numerous examples.
- Solved examples in each chapter illustrate the fundamental concepts and provide pedagogical reinforcement to ensure student comprehension.
- Incorporates necessary codal provisions such as IS 1893:2002, IS 13920:1993 and IS 4326:1976 for Seismic Analysis and Aseismic Design.
- Seismic Analysis and Aseismic Design of a five-storey RC frame is specially emphasized.
- Highlights the various new techniques in the field of earthquake engineering.

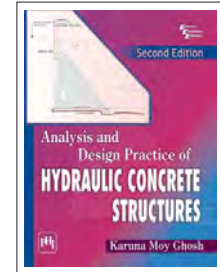
**CONTENTS:** Preface. Elements of Vibration. Undamped Free Vibration of SDOF System. Damped Free Vibration of SDOF System. Response of SDOF System to Harmonic Excitation. Response to Periodic Loading. Response to Impulse Loading. Two Degrees of Freedom System. Multiple Degrees of Freedom Systems. Elements of Seismology. Response Spectrum. Effect of Soil Properties and Damping on Seismic Performance of Structures. Liquefaction of Soils. Concept of Aseismic Design of RC Structures. Codal Provisions for Seismic Analysis of RC Buildings as per IS1893 (Part 1):2002. Step-by-Step Procedure for Seismic Analysis of RC Buildings. Codal Provisions for Ductile Detailing of RC Structures Subjected to Seismic Forces. Aseismic Design of a Multi-storey RC Building Based on IS13920:1990. New Techniques in Aseismic Design. Index.



Latest Print 2014 / 336 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3843-2 / 325.00

Civil/Environmental (STRUCTURES)

### Analysis and Design Practice of Hydraulic Concrete Structures, 2nd ed.



**KARUNA MOY GHOSH**, *formerly Chief Structural Engineer in Kaiser Engineers, Inc., and also Mott MacDonald Group (UK), and W.S. Atkins & Partners (India).*

This book provides a comprehensive description of the analysis and design process of some hydraulic concrete structures designed to retain and contain aqueous liquid. The first edition discussed six types of structures of different functions, namely:

- (a) An underground sedimentation tank for sewage treatment.
- (b) An underground digestion tank for sludge treatment.
- (c) An underground reservoir to store fresh potable water.
- (d) An immersed highway tunnel under the river bed.
- (e) An indoor swimming pool of rectangular shape for public recreation.
- (f) A gravity dam across a valley for converting the valley into a fresh water reservoir.

This Second Edition incorporates another type of hydraulic structure, namely **spillway**.

The spillway structure plays a vital role in regulating the designed reservoir water level to meet the fluctuating demand of water supply for the generation of hydro-electricity, irrigation and water supply purposes in controlling the height of reservoir water level downstream of the river. The spillway structure subjected to seismic hydrodynamic pressure in addition to the hydrostatic pressure, has been analysed and designed in full compliance with Eurocodes EC 2: Part 1-1 and Part 3 as water-retaining structure. The other six structures have been analysed and designed with reference to the relevant clauses of codes of practice prescribed in Eurocodes 2 and BS 8007 and BS 8110.

The book is designed to serve as a useful practical guide and a valuable reference for senior undergraduate students of civil engineering and postgraduate students specializing in structural design, as well as practising and consulting engineers involved in the design and execution of hydraulic concrete structures.

**CONTENTS:** Preface. Design Philosophy and Practices. Sedimentation Tank. Digestion Tank. A Covered Fresh Water Service Reservoir in a Rural District Community. Immersed Highway Tunnel Crossing a River. Underground Tanks for the Private and Public Swimming Pool Facilities. A Gravity Dam for Fresh Water Reservoir. Spillway Structure. Index.

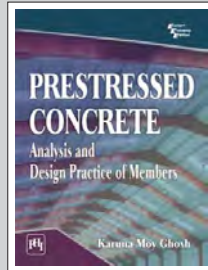
Latest Print 2013 / 180 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4594-2 / 195.00



## ENGINEERING

### Civil/Environmental (STRUCTURES)

#### Prestressed Concrete: Analysis and Design Practice of Members



**KARUNA MOY GHOSH**, formerly Chief Structural Engineer in Kaiser Engineers, Inc., and also Mott MacDonald Group (UK), and W.S. Atkins & Partners (India).

This book addresses an overall approach presenting comprehensive principles and description of the analysis and design of prestressed concrete members—from its initial design concepts, analysis, to the construction stage. The structural components are analyzed and designed to conform to the requirements of Eurocodes [that are similar to Indian Standard Codes] followed throughout the world.

In order to elaborate on the concept of prestressed concrete, seven different cases are dealt with in this book to give a practical insight of the subject to the students.

The concepts explained are well-supported with the mathematical derivations and problem calculations. Illustrative figures and tables further makes the understanding of the concepts easier.

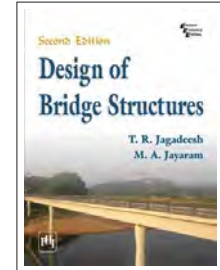
The book serves as a reference for the undergraduate students of civil and structural engineering.

**CONTENTS:** Preface. Principles and Practices. Materials. Criteria for Analysis and Design. Structural Analysis and Design. Case Studies—I: A Precast Prestressed Concrete Floor Plank. II: A Prestressed Concrete Floor Plank and Beam of a Multistoreyed Steel Framed Building. III: A Simply Supported Precast Prestressed Concrete Beam. IV: A Simply Supported Post-Tensioned Precast Concrete Roof Beam. V: Design of a Prestressed Concrete Gantry Girder. VI: A Prestressed Concrete Circular Water Tank. Case Study. VII: A Precast Prestressed Concrete Pile. Index.



Latest Print 2014 / 200 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4843-1 / ₹ 225.00

#### Design of Bridge Structures, 2nd ed.



**T.R. JAGADEESH**, Principal of H.M.S. Institute of Technology, Tumkur.

**M.A. JAYARAM**, Professor and Head with the Department of Master of Computer Applications, Siddaganga Institute of Technology, Tumkur.

This updated Second Edition of the textbook on bridge design continues to provide comprehensive coverage of both theory and design practice within the compass of a single volume. It is intended for the students pursuing courses in civil engineering at both undergraduate and postgraduate levels. It is also considered useful for practising civil engineers and designers who need a ready reckoner on important design aspects of bridges.

The second edition has three main objectives. First, it provides general updates of the bridge designs as per the revised IRC codes. Second, it incorporates all round improvement to the presentation of the material. Third, and more importantly, the second edition makes the book complete by incorporating topics like *prestressed concrete bridge decks* and applications of *artificial intelligence in bridge engineering*.

The most distinguishing features of the book comprise:

- Detailed design drawings of bridges
- Coverage of both hydraulic and structural design of bridges
- Numerous solved examples to illustrate both analysis and design calculations
- Computer programs to initiate students into the field of computer-aided projects in bridge design.

**CONTENTS:** Preface. Section I: Hydraulic Design—Introduction. Catchments. River Channels. Questions. Problems. Appendix. References. Section II: Structural Design—Design Loads for Bridges. Masonry Arch Bridges. Pipe Culverts. Slab Bridges. Box Culverts. Beam and Slab Bridges. Plate Girder Bridges. Composite Bridges. Substructures. Bridge Foundations. Bearings and Expansion Joints. Prestressed Concrete Bridge Decks. Artificial Intelligence in Bridge Engineering. Appendix. References. Index.

Latest Print 2014 / 356 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3852-4 / ₹ 350.00

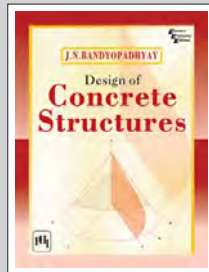


## ENGINEERING

### Civil/Environmental (STRUCTURES)

#### Design of Concrete Structures

**J.N. BANDYOPADHYAY,**  
*Professor of Civil Engineering,  
Indian Institute of Technology  
Kharagpur.*



This text primarily analyses different methods of design of concrete structures as per IS 456: 2000 (Plain and Reinforced Concrete—Indian Standard Code of Practice, 4th revision, Bureau of Indian Standards). It gives greater emphasis on the limit state method so as to illustrate the acceptable limits for the safety and serviceability requirements of structures.

Besides dealing with yield line analysis for slabs, the book explains the working stress method and its use for designing reinforced concrete tension members, theory of redistribution of moments, and earthquake resistant design of structures. This well-structured book develops an effective understanding of the theory through numerous solved problems, presenting step-by-step calculations. The use of SP-16 (Design Aids for Reinforced Concrete to IS: 456-1978) has also been explained in solving the problems.

#### KEY FEATURES

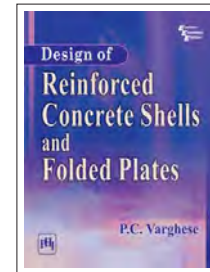
- **Instructional Objectives** at the beginning of the chapter highlight important concepts.
- **Summary** at the end of the chapter to help student revise key points.
- **Sixty-nine solved illustrative examples** presenting step-by-step calculations.
- Chapter-end exercises to test student's understanding of the concepts.
- **Forty Tests** to enable students to gauge their preparedness for actual exams.

This comprehensive text is suitable for undergraduate students of civil engineering and architecture. It can also be useful to professional engineers.

**CONTENTS:** Preface. Acknowledgements. Objectives and Methods of Analysis and Design. Properties of Concrete and Steel. Philosophies of Design by Limit State Method. Limit State of Collapse: Flexure (Theory and Problems). Doubly Reinforced Beams: Theory and Problems. Flanged Beams: Theory and Numerical Problems. Limit State of Collapse in Shear: Theory and Numerical Problems. Bond, Anchorage, Development Length and Torsion. Limit State of Serviceability. Reinforced Concrete Slabs. Staircases. Compression Members. Foundations: Theory and Design. Yield Line Analysis for Slabs. Working Stress Method. Tension Members. Redistribution of Moments. Earthquake Resistant Design of Structures. Index.

Latest Print 2014 / 612 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3277-5 / 450.00

#### Design of Reinforced Concrete Shells and Folded Plates



**P.C. VARGHESE,** *Honorary Professor at Anna University, Chennai, was formerly Professor and Head, Department of Civil Engineering, IIT Madras.*

This comprehensive and well-organized text provides a masterly exposition of the fundamentals of analysis and design of reinforced concrete shells and folded plates, commonly known as **thin concrete roof structures**. Divided into 20 chapters, the book presents practical designs of different types of domes, cylindrical shells, paraboloids, conoids, and groined shells, as well as various types of folded plates. The text also incorporates tables from ASCE Manual No. 31.

The book explains the subject in such a way that it can be easily understood even by students who have a basic knowledge of mathematics. Students will find the chapters on Folded Plates particularly useful as these structures are easy to build. After studying the book, their analysis and design can be done with greater ease.

This reader friendly book is intended as a text for the postgraduate students of Civil Engineering/Architecture. As with all the books of Prof. P.C.Varghese, who brings in all his years of experience and expertise into his work, this book too would be of enormous help to practising engineers and architects besides the students.

**CONTENTS:** Foreword. Preface. Introduction. Historical Development of Modern Shell Roofs. Common Types of Shell Roofs. Classical Method of Analysis of Reinforced Concrete Shells. Spherical Domes and Conical Roofs. Analysis of Circular Cylindrical Shells. Beam Theory for Long Cylindrical Shells. Static Checks of Results of Analysis of Cylindrical Shells. Analysis of Circular Cylindrical Shells with Edge Beams. Detailing of Steel in Cylindrical Shells. Design of Transverse Stiffeners of Cylindrical Shells. Paraboloid Shells (Hyperbolic Paraboloids). Parabolic Conoids. Groined Shells. Design and Construction of a Groined Shell—*An Example*. Folded Plates—Preliminary Analysis. Folded Plates—Correction Analysis—Simpson's Method. Example to Illustrate Complete Analysis of Folded Plates. Design of Reinforcements in Folded Plates and Supporting Diaphragms. Buckling of R.C. Roof Shells. Design of Pyramid Roofs. Appendix—A. A Short History of Masonry Domes. B. Funicular Shells. C. Geometric Curves. D. Tension Structures. E. Tables from ASCE Manual No. 31. Bibliography. Index.

Latest Print 2014 / 360 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4111-1 / 425.00



## ENGINEERING

Civil/Environmental (STRUCTURES)

### Earthquake Resistant Design of Structures

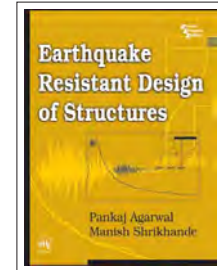
**PANKAJ AGARWAL**, Assistant Professor at the Department of Earthquake Engineering, Indian Institute of Technology Roorkee.

**MANISH SHRIKHANDE**, Assistant Professor at the Department of Earthquake Engineering, Indian Institute of Technology Roorkee.

This comprehensive and well-organized book presents the concepts and principles of earthquake resistant design of structures in an easy-to-read style. The use of these principles helps in the implementation of seismic design practice. The book adopts a step-by-step approach, starting from the fundamentals of structural dynamics to application of seismic codes in analysis and design of structures. The text also focusses on seismic evaluation and retrofitting of reinforced concrete and masonry buildings. The text has been enriched with a large number of diagrams and solved problems to reinforce the understanding of the concepts.

Intended mainly as a text for undergraduate and postgraduate students of civil engineering, this text would also be of considerable benefit to practising engineers, architects, field engineers and teachers in the field of earthquake resistant design of structures.

**CONTENTS:** Preface. Contributors. Part I: Earthquake Ground Motions—Engineering Seismology. Seismic Zoning Map of India. Strong Motion Studies in India. Strong Motion Characteristics. Evaluation of Seismic Design Parameters. Part II: Structural Dynamics—Initiation into Structural Dynamics. Dynamics of Single Degree of Freedom Systems. Theory of Seismic Pickups. Numerical Evaluation of Dynamic Response. Response Spectra. Dynamics of Multi-Degree-of-Freedom Systems. Part III: Concepts of Earthquake Resistant Design of Reinforced Concrete Building—Earthquake and Vibration Effect on Structures:



Basic Elements of Earthquake Resistant Design. Identification of Seismic Damages in RC Buildings during Bhuj Earthquake. Effect of Structural Irregularities on the Performance of RC Buildings during Earthquakes. Seismoresistant Building Architecture. Part IV: Seismic Analysis and Modelling of Reinforced Concrete Building—Code Based Procedure for Determination of Design Lateral Loads. Consideration of Infill Wall in Seismic Analysis of RC Buildings. Step-by-Step Procedure for Seismic Analysis of a Four-storeyed RC Building as per IS 1893 (Part 1): 2002. Mathematical Modelling of Multi-storeyed RC Buildings. Part V: Earthquake Resistant Design (ERD) of Reinforced Concrete Buildings—Ductility Considerations in Earthquake Resistant Design of RC Buildings. Earthquake Resistant Design of a Four-storey RC Building Based on IS 13920: 1993. Earthquake Resistant Design of Shear Wall as per IS 13920: 1993. Capacity Based Design—An Approach for Earthquake Resistant Design of Soft Storey RC Buildings. Part VI: Earthquake Resistant Design (ERD) of Masonry Buildings—Identification of Damages and Non-Damages in Masonry Buildings from Past Indian Earthquakes. Elastic Properties of Structural Masonry. Lateral Load Analysis of Masonry Buildings. Seismic Analysis and Design of Two-storeyed-Masonry Buildings. Part VII: Seismic Evaluation and Retrofitting of Reinforced Concrete and Masonry Buildings. Seismic Evaluation of Reinforced Concrete Buildings: A Practical Approach. Seismic Retrofitting Strategies of Reinforced Concrete Buildings. Seismic Retrofitting of Reinforced Concrete Buildings—Case Studies. Seismic Provisions for Improving the Performance of Non-engineered Masonry Construction with Experimental Verifications. Retrofitting of Masonry Buildings. Index.

Latest Print 2014 / 660 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2892-1 / ₹ 450.00

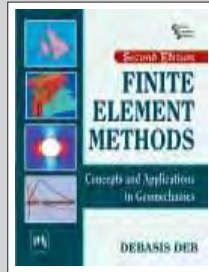


## ENGINEERING

### Civil/Environmental (STRUCTURES)

#### Finite Element Methods: Concepts and Applications in Geomechanics, 2nd ed.

**DEBASIS DEB**, Professor in the Department of Mining Engineering at the Indian Institute of Technology Kharagpur.



Computational geomechanics is an emerging field in the disciplines of Mining, Civil and Geotechnical Engineering. Recent advancements in finite element methods (FEMs) have made it possible to solve a variety of complex problems related to geomechanics. This thoroughly revised second edition enhances the knowledge of the finite element methods in design and analysis of structures and excavations made in rock mass. A fine blend of finite element methodology and principles of rock mechanics, the text emphasizes the basics of stress-strain analysis, anisotropic material behaviour, isoparametric finite element method, rock mass yielding/failure behaviour and its formulation in FEM procedure, rock joint behaviour as equivalent material and discrete system. Analytical and numerical formulations of interaction between rock bolts and rock mass are introduced emphasizing parameters which affect bolt performance.

Besides senior undergraduate and postgraduate students of Mining, Civil and Geotechnical Engineering, the book would also be useful to practising engineers and researchers who wish to acquaint themselves with the state-of-the-art techniques of finite element methods.

#### NEW TO THIS EDITION

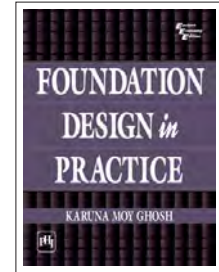
- Provides an in-depth analysis of strength and deformability of jointed rock mass.
- Discusses the application of airy stress function for solving problems in solid mechanics.
- Adds a new chapter on *Analysis of Rock Bolts*.
- Contains two new appendices—*Gauss Quadrature Rule and Closed Form Integration in Natural Coordinates*.
- Includes several new worked-out examples and exercises.
- Interaction between rock bolt and rock mass is analyzed
- Elaborates formulations.

**CONTENTS:** Preface. Analysis of Stresses and Strains. Stress-Strain Relationship. Introduction of Finite Element Method in Elasticity: Isoparametric Triangular Elements. Quadrilateral Finite Elements. Axisymmetric and Three-dimensional Finite Element Method. Rock and Rock Mass Failure Criteria. Elastic-Plastic Finite Element Analysis. Strength and Deformability of Jointed Rock Mass. Finite Element Procedures for Analysis of Rock Joints. Analysis of Rock Bolts. Appendices—A: Galerkin Finite Element Method. B: Skyline Storage of Stiffness Matrix. C: Gauss Quadrature Rule. D: Closed Form Integration in Natural Coordinates. References. Index.



Latest Print 2013 / 376 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4295-8 / ₹ 350.00

#### Foundation Design in Practice



**KARUNA MOY GHOSH**, formerly Chief Structural Engineer in Kaiser Engineers Inc.

The behaviour of foundation is closely interlinked with the behaviour of soil supporting it. This book develops a clear understanding of the soil parameters, bearing capacity, settlement and deformation, and describes the practical methods of designing structural foundations.

The book analyses the various types of foundations, namely isolated footing, strip foundation and raft foundation, and their structural design. It discusses piled foundation, the types and behaviour of piles in various soils (cohesive and cohesionless), and their bearing capacity. The book also includes the analysis, design and construction of diaphragm wall foundation used in highway and railway tunnels, multi-storey basement and underground metro stations. In addition, it includes the analysis and design of sheet piling foundation, retaining wall and bridge pier foundation.

#### KEY FEATURES

- Demonstrates both BS codes of practice and Eurocodes to analyse soil and structural design of foundations and compares the results
- Includes a number of examples on foundations
- Provides structural design calculations with step-by-step procedures
- Gives sufficient numbers of relevant sketches, figures and tables to reinforce the concepts

This book is suitable for the senior undergraduate students of civil engineering and postgraduate students specializing in geotechnical engineering. Besides, practising engineers will also find this book useful.

**CONTENTS:** Preface. Principles and Practice. Geotechnics. Isolated Footing Foundations. Combined Spread Footing Foundations. Strip Footing Foundations. Mat or Raft Foundation. Piled Foundation. Diaphragm Wall Foundation. Sheet Piling Foundation. Retaining Walls. Lateral Supports in Open Cuts. Bridge Pier and Foundation. Underpinning. Caisson Foundation. Annex D (Informative). Index.

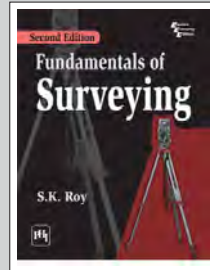
Latest Print 2012 / 340 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3588-2 / ₹ 295.00



## ENGINEERING

Civil/Environmental (SURVEYING)

### Fundamentals of Surveying, 2nd ed.



**S.K. ROY**, has taught for more than 30 years at Jalpaiguri Government Engineering College and Bengal Engineering and Science University.

Primarily aimed to be an introductory text for the first course in surveying for civil, architecture and mining engineering students, this book, now in its second edition, is also suitable for various professional courses in surveying.

Written in a simple and lucid language, this book at the outset, presents a thorough introduction to the subject. Different measurement errors with their types and nature are described along with measurement of horizontal distances and electronic distances measurements. This text covers in detail the topics in levelling, angles and directions and compass survey. The functions and uses of different instruments, such as theodolites, tacheometers and stadia rods are also covered in the text. Besides, the book elaborates different fields of surveying, such as plane table surveying, topographical surveying, construction surveying and underground surveys. Finally, the book includes a chapter on computer applications in surveying.

#### KEY FEATURES

- Includes about 400 figures to explain the fundamentals of surveying.
- Uses SI units throughout the book.
- Offers more than 170 fully-solved examples including the questions generated from premier universities.
- Provides a large number of problems and answers at the end of each chapter.
- Incorporates objective questions from AMIE exams and Indian Engineering Services exams.

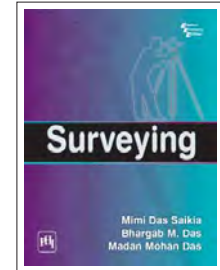
**CONTENTS:** Preface. Introduction. Errors in Measurement. Measurement of Horizontal Distances. Electronic Distance Measurements. Levelling I. Levelling II. Permanent Adjustments of Levels. Angles and Directions. Compass Survey. Theodolites. Traverse Survey and Computations. Curves. Vertical Curves. Areas and Volumes. Tacheometry. Plane Table Surveying. Topographical Surveying. Construction Surveying. Underground Surveys. Computer Programs in Surveying. Appendices. Bibliography. Answers to Problems. Index.



Latest Print 2014 / 624 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4198-2 / ₹ 395.00

PHI Learning: Publications

### Surveying



**MIMI DAS SAIKIA**, Professor, Civil Engineering Department, Assam Down Town University, Guwahati.

**BHARGAB MOHAN DAS**, Chief Business Development Officer, Executive Project Coordinator and Chairperson of Green Building Division, Ritta Co., Ltd., Thailand.

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

Intended as a textbook for the undergraduate students of civil engineering, this comprehensive book depicts all elements of surveying including its types, tools and the most recent techniques, to overcome the barriers in construction. The book details on the elementary methods of measurements like tapes and chains to the most advanced ones like remote sensing and photogrammetry.

The book discusses types of surveying, advanced techniques evolved and the methodologies adopted to conduct surveys, in logical sequence. It systematically elucidates the concepts of land surveying, hydrographic surveying, compass surveying and so on, deriving the formulas through simple geometry, trigonometry and differential calculus. Besides, it educates the learner to handle measuring instruments, and teaches the ways to take the measurements accurately, in steps.

#### KEY FEATURES

- Contains figures and tables to illustrate the concepts
- Incorporates problems, and objective questions to test students' comprehension of the subject
- Provides Solved Examples to impart practical knowledge to the students
- Includes the most recent surveying topics like EDM, Total stations, GIS, GPS and DTM

The book is also useful for the students of architecture, mining, geology and environmental engineering as well.

**CONTENTS:** Preface. Introduction of Surveying. Measurements and Errors. Chain Surveying. Compass Survey. Levelling. Contouring. Plane Table Surveying. Theodolite. Traverse Surveying. Computation of Areas. Computation of Volume. Simple Curve. Compound Curves. Reverse Curve. Transition Curve. Vertical Curve. Tacheometric Surveying. Setting Out Works. Hydrographic Surveying. Introduction to Photogrammetric Surveying. Electronic Distance Measurement (EDM). Introduction to Triangulation. Trilateration. Map Projection. Remote Sensing: An Introduction. Index.

Latest Print 2013 / 484 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3985-9 / ₹ 350.00

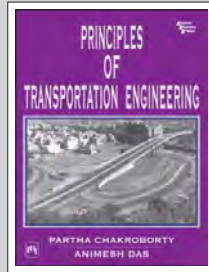




## ENGINEERING

Civil/Environmental (TRANSPORTATION ENGINEERING)

### Principles of Transportation Engineering



**PARTHA CHAKROBORTY** and **ANIMESH DAS**, both with Department of Civil Engineering, Indian Institute of Technology Kanpur.

This book offers a comprehensive and lucid introduction to the basic principles and modern techniques of transportation which is fast evolving as an engineering discipline. It also offers ubiquitous traditional methods that support transportation infrastructure.

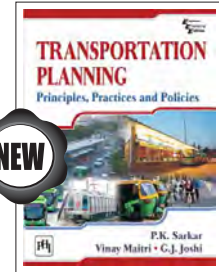
Designed as a textbook, in Indian context, for the undergraduate and graduate courses in civil engineering, the book also fills the void of references available on the subject.

Lavish pedagogic features such as illustrative examples, exercise problems and ample visuals from the real world provide a vivid description of the concepts and help develop problem-solving skills among the readers.

**CONTENTS:** Preface. Introduction. Part I: Traffic Engineering—Vehicle and Driver Characteristics. Highway Geometric Design. Traffic Flow. Design of Traffic Facilities. Part II: Public Transportation—Routing and Scheduling of Transit Systems. Capacity of Transit Systems. Part III: Transportation Planning—Transportation Planning Process. Traffic Demand Forecasting. Part IV: Pavement Engineering—Pavement Materials and Characterization. Pavement Analysis. Pavement Design. Highway Construction. Highway Maintenance. Part V: Transportation Economics—Highway Economics and Finance. Part VI: Advanced Topics—Annexures. Index.

Latest Print 2014 / 536 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2084-0 / ₹ 395.00

### Transportation Planning: Principles, Practices and Policies



**PRADIP KUMAR SARKAR**, Professor, Department of Transport Planning, School of Planning and Architecture, New Delhi.

**VINAY MAITRI**, Professor of Programming and Head of the Centre for Analysis and System Studies, GIS and Remote Sensing, School of Planning and Architecture, New Delhi.

**G.J. JOSHI**, Civil Engineering, is Associate Professor, Department of Civil Engineering, SVNIT, Surat.

Transportation planning plays a useful role as a lifeline for any society. It comprises applications of science and art, where a great deal of judgement coupled with its technical elements is required to arrive at a meaningful decision in order to develop transportation infrastructure facilities for the community. Transportation planning, thereby, helps in achieving a safer, faster, comfortable, convenient, economical and environment-friendly movement of people and goods traffic.

In this context, an attempt has been made to write a comprehensive book on this subject, which not only deals with the basic principles and fundamentals of transportation planning but also keeps abreast of the current practices and policies conducted in transportation planning.

Divided into 23 chapters, the book felicitously proffers the fundamental techniques of transportation planning and travel demand modelling, urban form and urban structure and their relation with transport pattern, land use-transport model, accessibility and mobility consideration in transport modelling, graph theory and road network planning, cost benefit analysis, mass transport planning, applications of intelligent transport system, applications of software in transport planning, and transport policies.

Exploiting a systematic approach avoiding prolixity, this book will prove to be a vade mecum for the undergraduate and postgraduate students of civil engineering and transportation engineering. Besides, this book is of immense benefit to the students opting a course on Master of Planning conducted in various institutes.

**CONTENTS:** Preface. Introduction to Transportation Planning. Study Area. Traffic Surveys and Data Collection. Travel Demand Forecasting Techniques. Trip Generation Model. Trip Distribution Models. Modal Split. Mode Choice Modelling through SP and RP Data. Traffic Assignment. Study on Goods/Freight Movement. Long Term Transport Planning. Regional Transportation Planning. Accessibility and Mobility Considerations in Transport Planning. The Lowry Land Use-Transport Model. Transport Supply. Graph Theory: Approach to Road Network. Intermodal Integration. Urban Form, Urban Structure Relationship with Transport Pattern. Cost Benefit Analysis. Transit Planning and Scheduling. Applications of ITS in Transport System. Applications of Software in Transport Planning. Transport Policies. Annexures. Index.

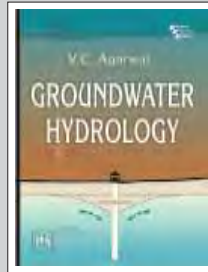
Latest Print 2014 / 472 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4994-0 / ₹ 495.00



## ENGINEERING

### Civil/Environmental (WATER RESOURCES ENGINEERING)

#### Ground Water Hydrology



**V.C. AGARWAL**, Professor and Head, Department of Civil Engineering, Shepherd School of Engineering and Technology, SHIATS, Naini, Allahabad.

This book presents a comprehensive discussion of basics of groundwater hydrology, its hydrologic and engineering aspects, and the mechanics involved in the study of flow of groundwater. The matter is presented in a logical sequence, placing emphasis on the application of theory and on the practical aspects of groundwater hydrology.

The book introduces the geological formations of aquifers, discusses soil physics, describes the solutions of differential equations for confined and unconfined aquifers, elucidates groundwater flow equations and explains the phenomenon of interference of wells.

The book also deals with tube wells and open wells, their design criteria, construction and work, revitalization and spacing, as well as their potential for irrigation. The issues of groundwater prospecting, analog models to study the response of aquifers to simulated field conditions, the current issues of concern pertaining to quality parameters of groundwater, and applications of remote sensing for survey and geological explorations for groundwater, are all addressed in the latter part of the book.

The book is intended for the senior undergraduate students of civil engineering and postgraduate students (who specialize in Water Resources Engineering) of civil engineering. Besides it will be useful to the students pursuing courses in agricultural engineering.

#### KEY FEATURES

- Includes numerous objective-type questions (with answers) at the end of each chapter
- Contains worked-out numerical problems
- Provides chapter-end questions and unsolved numerical problems with answers for practice by students

**CONTENTS:** Preface. Groundwater: An Overview. Continuity Equations. Solutions of One-dimensional Differential Equations for Confined and Unconfined Aquifers. Groundwater Flow Equations. Interference of Wells. Tube Well. Well Irrigation. Groundwater Geophysics. Analog Models. Water Quality. Remote Sensing. Index.

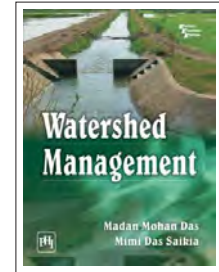
Latest Print 2012 / 372 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-4619-2 / ₹ 325.00



PHI Learning: Publications

#### Watershed Management



**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.

Watershed management has evolved and passed through several developmental stages. Realising the importance of watershed management, great efforts have been made by the government in preparing implementation strategies and the technical institutions have also introduced the subject in their curriculum at senior undergraduate and postgraduate levels of civil and agricultural engineering. Since this is a multidisciplinary subject, it finds place in environmental science and forestry curriculum as well. The book, comprising of 16 chapters, provides comprehensive coverage of the subject. Covering the concepts and principles of watershed management, the book discusses watershed characteristics, causes of watershed deterioration, soil erosion and soil-water relationship, management of natural drainages in watershed, wasteland, landslide and land drainage management, arable and non-arable land, design flow and design storm and effect of watershed on the community. Chapters on flood routing through channels and reservoirs in watershed and flood damage mitigation management in watershed add further value to the book.

**CONTENTS:** Preface. Concept of Watershed Management. Principles of Watershed Management. Participatory Rural Appraisal in Watershed Programme. Soil Erosion and Soil Water Relationship. Management of Natural Drainages in Watershed. Wasteland, Landslide and Land Drainage Management. Hydrologic components of watershed. Management of Arable Land. Management of Non-Arable Land. Production Systems in Arable and Non-Arable Land. Estimation of Design flood and Design storm in Watershed. Flood Routing in Watershed through Channels and Reservoirs. Flood Damage Mitigation Management in Watershed. Water Harvesting, Recycling and Reuse in Watershed. Watershed Modelling. Monitoring, Evaluation, Research & Post Project Management of Watershed. Index.

Latest Print 2013 / 312 pp. / 17.8 × 23.5 cm

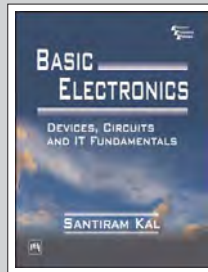
ISBN-978-81-203-4676-5 / ₹ 295.00



## ENGINEERING

### Core Engineering

#### Basic Electronics: Devices, Circuits and IT Fundamentals



**SANTIRAM KAL**, Professor, Department of Electronics and Electrical Communication Engineering, Indian Institute of Technology Kharagpur.

This comprehensive and well-organized text discusses the fundamentals of electronic communication, such as devices and analog and digital circuits, which are so essential for an understanding of digital electronics. Professor Santiram Kal, compresses, within the covers of a single volume, all the aspects of electronics—both analog and digital—encompassing devices such as microprocessors, microcontrollers, fibre optics, and photonics. In so doing, he has struck a fine balance between analog and digital electronics.

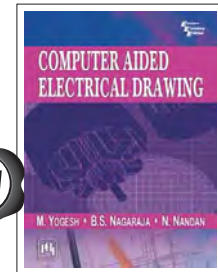
A distinguishing feature of the book is that it gives case studies in modern applications of electronics, including information technology, that is, DBMS, multimedia, computer networks, Internet, and optical communication.

Worked-out examples, interspersed throughout the text, and the large number of diagrams should enable the student to have a better grasp of the subject. Besides, exercises, given at the end of each chapter, will sharpen the student's mind in self-study. These student-friendly features are intended to enhance the value of the text and make it both useful and interesting.

**CONTENTS:** Preface. Acknowledgements. An Introduction to Electronics. Semiconductors, Materials and Junction Diodes. Junction Diodes and Their Applications. BJTs and FETs. Transistor Biasing and Small Signal Amplifiers. Feedback Amplifiers and Oscillators. Operational Amplifiers. Digital Logic and Combinational Circuits. Sequential Logic Circuits. Analog-to-Digital and Digital-to-Analog Conversion. Data Acquisition Systems. Memory Systems. Microcomputers and Microprocessors. Communication Systems. Fibre Optics and the Information Age. Fundamentals of Information Technology. Bibliography. Select Answers to Objective-type Questions and Numerical Problems. Index.

Latest Print 2013 / 584 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-1952-3 / ₹ 350.00

#### Computer Aided Electrical Drawing



**M. YOGESH**, Assistant Professor, Department of Electrical and Electronics Engineering, Dayananda Sagar College of Engineering, Bangalore.

**B.S. NAGARAJA**, Assistant Professor, Department of Electrical and Electronics Engineering, Dayananda Sagar College of Engineering, Bangalore.

**N. NANDAN**, Assistant Professor, Department of Electrical and Electronics Engineering, Dayananda Sagar College of Engineering, Bangalore.

Intended as a text for the undergraduate students of electrical engineering, it emphasises on design concept and drawing electrical apparatus based on design approach.

To stay at par with the present day technology, AutoCAD® 2014 is used in this book to draw electrical apparatus. It gives a comprehensive view of winding diagrams of different machines, its types along with the assembling technique of various electrical machines and also the single line representations of the power system with various standard symbols. This book has been prepared to meet the needs of the students in a simpler manner. Every topic has been dealt carefully with necessary explanation and presentation of the material is lucid. This student-friendly text also covers those topics which are required by aspiring engineers in practical situations along with the present industrial requirements and standards.

#### KEY FEATURES

- Use of plenty of illustrations for explaining the concepts or the principles.
- Inclusion of practical problems with their solutions.
- Graded exercises and model questions at the end of each chapter.

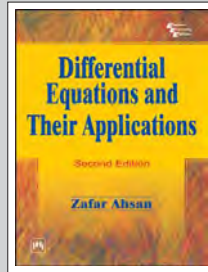
**CONTENTS:** Foreword. Preface. Acknowledgements. Introduction to Electrical Drawing and CAD. DC Lap Winding. DC Wave Winding. AC Winding. Single Line Diagrams and Sub-Stations. DC Machine Assembly. AC Machine Assembly. Transformer Assembly. Index.

Latest Print 2014 / 240 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4953-7 / ₹ 295.00

## ENGINEERING

### Core Engineering

#### Differential Equations and Their Applications, 2nd ed.



**ZAFAR AHSAN**, Reader, Department of Mathematics, Aligarh Muslim University, Aligarh (Uttar Pradesh).

Primarily intended for the undergraduate students in Mathematics, Physics and Engineering, this text gives in-depth coverage of differential equations and the methods of solving them.

The book begins with the basic definitions, the physical and geometric origins of differential equations, and the methods for solving first-order differential equations. Then it goes on to give the applications of these equations to such areas as biology, medical sciences, electrical engineering and economics. The text also discusses, systematically and logically, higher-order differential equations and their applications to telecommunications, civil engineering, cardiology and detection of diabetes, as also the methods of solving simultaneous differential equations and their applications.

This book fusion of theory and application is useful for postgraduate students.

#### NEW TO THE SECOND EDITION

- A section (Section 5.11): Series Solution of a Differential Equation-Frobenius Method.
- A chapter (Chapter 10): Calculus of Variations and Its Applications.

**CONTENTS:** Preface. Preface to the First Edition. Basic Concepts. Differential Equations of First Order and First Degree. Equations of the First Order but not of the First Degree. Applications of First-order Differential Equations. Higher-order Linear Differential Equations. Applications of Higher-order Differential Equations. Systems of Linear Differential Equations and Their Applications. Laplace Transforms and Their Applications to Differential Equations. Partial Differential Equations and Their Applications. Calculus of Variations and Its Applications. Bibliography. Answers to Exercises. Index.

Latest Print 2013 / 528 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-2523-4 / ₹ 350.00



#### Elements of Electrical Engineering, 5th ed.



**M. MARIA LOUIS**, Former Principal, Thiagarajan College of Engineering, Madurai and Former Director, Karunya Institute of Technology, Coimbatore.

The book, in its fifth edition, has been revised comprehensively incorporating additional chapters on dc circuits, electromagnetic induction, electrostatics, dc machines, ac circuits and transformers. Also, the full chapters devoted to synchronous alternators, synchronous motors, induction motors, ac commutator motors, and special machines have been introduced in the book to cover the entire spectrum of electrical machines.

Further, this new edition includes additional worked-out examples and a large number of multiple-choice questions to make this book an invaluable tool for students and also for candidates preparing for competitive examinations.

The book is intended to be a test for undergraduate students of engineering. It will also be of immense use to the faculty members and practicing engineers.

#### KEY FEATURES

- Each chapter is divided into a number of sub sections to introduce the subject matter coherently so as to enable the student to understand the development of the text.
- The language employed is simple and lucid with substantial number of diagrams, sketches etc
- End of chapter additional worked out examples
- More than 500 problems (with answers) at the end of chapters for the students to work on
- Nearly 750 multiple choice questions with answers.

**CONTENTS:** Preface. Chapter 1 Electricity Basic Concepts. Conductors, Resistors, and Insulators. Direct Current Circuits. SI Units and Power Energy Calculations. Magnetic Effects of Electric Currents. Magnetic Circuit. Electromagnetic Induction. Electrostatics. DC Generator: Construction and Operating Principles. DC Generator Characteristics. Parallel Operation of DC Generators. DC Motor. Commutation in DC Machines. Testing of DC Machines. Alternating Current Circuits. Single Phase Transformers. Three Phase and Specialty Transformers. Synchronous Generators. Parallel Operation of Synchronous Alternators. Synchronous Motors. Three Phase Induction Motors. Single Phase Induction and Specialty Motors. Special Purpose Motors. A.C. Commutator Motors. Electrical Measuring Instruments. House Wiring. Index.

Latest Print 2014 / 996 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4852-3 / ₹ 695.00



## ENGINEERING

### Core Engineering

#### Elements of Environmental Science and Engineering, 2nd ed.



**P. MEENAKSHI**, *Department of Civil Engineering, Coimbatore Institute of Technology, Coimbatore, Tamil Nadu.*

Designed as a text for all undergraduate students of engineering for their core course in Environmental Science and Engineering and for elective courses in environmental health engineering and pollution and control engineering for students of civil engineering, this comprehensive text provides an in-depth analysis of the fundamental concepts. It also introduces the reader to different niche areas of environmental science and engineering.

The book covers a wide array of topics, such as natural resources, disaster management, biodiversity, and various forms of pollution, viz. water pollution, air pollution, soil pollution, noise pollution, thermal pollution, and marine pollution, as well as environmental impact assessment and environmental protection.

#### KEY FEATURES

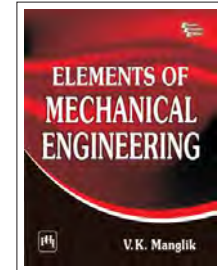
- Gives in-depth yet lucid analysis of topics, making the book user-friendly.
- Covers important topics, which are adequately supported by illustrative diagrams.
- Provides **case studies** to explore real-life problems.
- Supplies review questions at the end of each chapter to drill the students in self-study.

**CONTENTS:** Preface. Environmental Education—Present Scenario. Science of the Environment. Natural Resources. Disaster Management. Engineering Interventions. Ecosystems. Biodiversity. Water Pollution. Air Pollution. Soil Pollution. Noise Pollution. Thermal Pollution. Marine Pollution. Solid Wastes. Hazardous Wastes. Energy. Environmental Threats. Environmental Impact Assessment. Social Issues and the Environment. Environmental Protection. Index.

Latest Print 2014 / 348 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4523-2 / ₹ 295.00



#### Elements of Mechanical Engineering



**V.K. MANGLIK**, *Professor and Head of the Department of Automobile Engineering, Indus Institute of Technology and Engineering, Ahmedabad.*

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

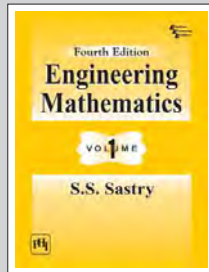


*PHI Learning: Publications*

## ENGINEERING

### Core Engineering

#### Engineering Mathematics, Vol. 1, 4th ed.



**S.S. SASTRY**, formerly Scientist/Engineer SF in the Applied Mathematics Division of Vikram Sarabhai Space Centre, Trivandrum, Kerala.

The Fourth Edition of this well-received book continues to serve as a basic text for beginning students of engineering of all branches. The new edition is largely revised and rewritten keeping in mind the recent changes in the Engineering Mathematics curriculum.

What distinguishes the new edition is the addition of many new examples and exercises drawn from the AMIE and IIT-JEE papers.

The book begins with a detailed discussion on higher algebra, geometry, vectors and complex numbers. The text then goes on to give an indepth analysis of geometry, vectors and complex numbers; applications of differential calculus; integration; and ordinary differential equations of the first order. The book concludes with a thorough treatment of numerical methods — a significant area of engineering mathematics.

#### WHAT'S NEW TO THIS EDITION

- A new Chapter (Chapter 5) on Ordinary differential equations of the First Order.
- Two sections on Diagonalization by Orthogonal Transformation, and Quadratic Forms (Chapter 1).
- Sections on Analytical Geometry of Three Dimensions (Chapter 2).
- Section on Numerical Methods for First Order Differential Equations (Chapter 5).
- Provides Answers to more exercise, which are now given at the end of each chapter.

With these additions and revisions, the book should appeal not only to students of engineering but also to practising engineers and scientists.

**CONTENTS:** Preface. Preface to the First Edition. Higher Algebra. Geometry, Vectors and Complex Numbers. Applications of Differential Calculus. Integration. Ordinary Differential Equations of the First Order. Numerical Methods. Bibliography. Index.

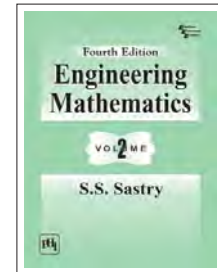
Latest Print 2014 / 688 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-3616-2 / 350.00



PHI Learning: Publications

#### Engineering Mathematics, Vol. 2, 4th ed.



**S.S. SASTRY**, formerly Scientist/Engineer SF in the Applied Mathematics Division of Vikram Sarabhai Space Centre, Trivandrum, Kerala.

The Fourth Edition of this accessible and student-friendly book continues to serve as a basic text for engineering students as part of their course in engineering mathematics. The new edition has substantial revisions and modifications, in light of the recent changes in the mathematics syllabi of engineering colleges/institutes.

Volume 2 focuses on differential equations of the second order, Laplace transforms, and inverse Laplace transforms and their applications to differential equations. It provides an in-depth analysis of functions of several variables and presents, in an easy-to-understand style, double, triple and improper integrals. The book also covers in detail vector analysis and the functions of a complex variable and has a fairly detailed discussion on advanced numerical methods.

#### NEW TO THIS EDITION

- Two new chapters (Chapters 3 and 4) on Functions of Several Variables and Multiple Integrals.
- Three new sections on Elastic Curves, Electric Circuits, and Matrix Methods for Systems of Linear Differential Equations (Chapter 1)
- New sections on Jacobians (Chapter 3) and Green's Theorem in a Plane (Chapter 5)
- Answers to more exercises, given at the end of each chapter.
- Several new illustrative examples and exercises.

With these additions, including the many pedagogic features—both existing and new ones—the text should prove to be highly useful to students of engineering and should also benefit practising engineers and scientists.

**CONTENTS:** Preface. Preface to the First Edition. Differential Equations of the Second Order. Laplace Transforms. Functions of Several Variables. Multiple Integrals. Vector Analysis. Functions of a Complex Variable. Advanced Numerical Methods. Bibliography. Index.

Latest Print 2014 / 624 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-3617-9 / 350.00



## ENGINEERING

### Core Engineering

#### 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

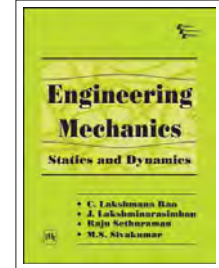
- Includes both vector and scalar analyses of topics.
- Emphasizes the practical applicability of Engineering Mechanics to the real-life situations.
- Gives key concepts to help instructors deliver the lecture in a better way.
- Includes a large number of worked-out examples to help students comprehend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



#### 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 2011 / 256 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2189-2 / 195.00

## ENGINEERING

### Core Engineering

#### Essentials of Ecology and Environmental Science, 5th ed.



**S.V.S. RANA**, former Vice Chancellor of Bundelkhand University, Jhansi. He has served Chaudhary Charan Singh University, Meerut as Professor and Head, Department of Zoology; Coordinator, Department of Environmental Science; and Coordinator, UGC Innovative Assistance Program in Toxicology.

This revised fifth edition, is a lucid presentation of the fundamental concepts and principles of ecology and environmental science. Extensively illustrated, the book provides in-depth coverage of major areas such as atmospheric and soil science, hydrobiology, biodiversity, and pollution ecology. It seeks to impart comprehensive understanding of the major ecological issues, policies and laws, crucial for solving environmental problems. New sections on vital topics such as acid rain and deposition, metapopulations, environmental disasters and the Bali Summit on Climate Change 2007 contribute strongly to this endeavour.

The book is primarily intended for undergraduate (B.Sc.) students of environmental science and other relevant biological sciences. It will also be very useful for postgraduate (M.Sc.) students of these subjects as well as field professionals and researchers.

#### KEY FEATURES

- Use of indigenous examples for explaining subject matter
- Coverage of extreme environments such as Antarctica, the Arctic region, open oceans, and deserts, along with up-to-date information on major ecosystems
- Chapters devoted to biodiversity as well as natural and genetic resources of India
- Detailed descriptions of ecocompartments such as atmosphere and lithosphere

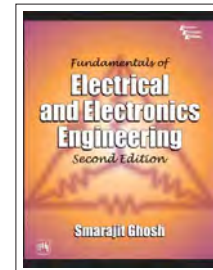
**CONTENTS:** Preface. Preface to the First Edition. Acknowledgements. Definition, Scope and History of Ecology. Ecology and Evolution. Environmental Adaptations. Climate and Atmosphere. Earth and Lithosphere. Hydrosphere. Biosphere. Bio-Geochemical and Nutrient Cycles. Environmental Factors and Species Interactions. Biodiversity. Genetic Resources. Natural Resources (Minerals, Energy, Water, Forests). Ecology of Populations. Concept of Community. Ecosystem (Structure and Function). Fragile Ecosystems. Air Pollution. Water Pollution. Noise Pollution. Radioactive Pollution. Solid Waste Pollution. Land Pollution. Global Environmental Problems. Environmental Disasters. Environmental Institutions. International Cooperation and Law. Glossary. Index.



Latest Print 2013 / 608 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-4786-1 / 375.00

PHI Learning: Publications

#### Fundamentals of Electrical and Electronics Engineering, 2nd ed.



**SMARAJIT GHOSH**, Professor, Department of Electrical and Instrumentation Engineering, Thapar University, Patiala.

This **second edition**, extensively revised and updated, continues to offer sound, practically-oriented, modularized coverage of the full spectrum of fundamental topics in each of the several major areas of electrical and electronics engineering.

- Circuit Theory • Electrical Measurements and Measuring Instruments • Electric Machines • Electric Power Systems • Control Systems • Signals and Systems • Analog and Digital Electronics including introduction to microcomputers

The book conforms to the syllabi of Basic Electrical and Electronic Sciences prescribed for the first-year engineering students. It is also an ideal text for students pursuing diploma programmes in Electrical Engineering.

Written in a straightforward style with a strong emphasis on primary principles, the main objective of the book is to bring an understanding of the subject within the reach of all engineering students.

#### WHAT IS NEW TO THIS EDITION

- Fundamentals of Control Systems (Chapter 24)
- Fundamentals of Signals and Systems (Chapter 25)
- Introduction to Microcomputers (Chapter 32)
- Substantial revisions to chapters on Transformer, Semiconductor Diodes and Transistors, and Field Effect Transistors
- Laplace Transform (Appendix B)
- Applications of Laplace Transform (Appendix C)
- PSpice (Appendix E)

**CONTENTS:** Preface. Preface to the First Edition. Acknowledgements. Basic Definitions and Units. Ohm's Law. Kirchhoff's Laws. DC Network Theorems. Electromagnetism. Magnetic Circuit. Inductance. Capacitance. DC Transients. Alternating Voltage and Current. Single-phase AC Circuits. Resonance. Three-phase Systems. Electrical Measurements and Measuring Instruments. AC Bridges. Transformer. Basic Concepts of Rotating Electrical Machines. DC Machines. DC Motors. Synchronous Machines. Polyphase Induction Motor. Fractional Horsepower Motors. Introduction to Power System. Fundamentals of Control Systems. Fundamentals of Signals and Systems. Diode and Triode. Semiconductor Diodes and Transistors. Field Effect Transistors. Operational Amplifier. Number System. Boolean Algebra. Introduction to Microcomputers. Appendices—A: Phasor Representation. B: Laplace Transform. C: Application of Laplace Transform. D: Two-port Networks. E: PSpice. Objective Type Questions. Bibliography. Index.

Latest Print 2014 / 576 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3299-7 / 450.00



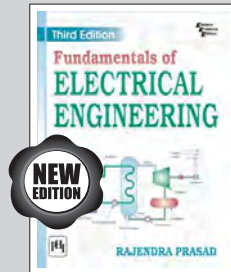


## ENGINEERING

### Core Engineering

#### Fundamentals of Electrical Engineering, 3rd ed.

**RAJENDRA PRASAD**, former Professor and Head, Department of Electrical Engineering, National Institute of Technology (NIT), Patna.



This comprehensive book, in its third edition, continues to provide an in-depth analysis on the fundamental principles of electrical engineering. The exposition of these principles is fully reinforced by many practical problems that illustrate the concepts discussed.

Beginning with a precise and quantitative detailing of the basics of electrical engineering, the text moves on to explain the fundamentals of circuit theory, electrostatic and electromagnetism and further details on the concept of electromechanical energy conversion. The book provides an elaborate and systematic analysis of the working principle, applications and construction of each electrical machine. In addition to circuit responses under steady state conditions, the book contains the chapters on dynamic responses of networks and analysis of a three-phase circuit.

In this third edition, two chapters on Electrical Power System and Domestic Lighting have been added to fulfil the syllabus requirement of various universities. The chapters discuss different methods of generating electrical power, economic consideration and tariff of power system, illumination, light sources used in lighting systems, conductor size and insulation, lighting accessories used in wiring systems, fuses and MCBs, meter board, main switch and distribution board, earthing methods, types of wiring, wiring system for domestic use and cost estimation of wiring system.

Designed as a text for the undergraduate students of almost all branches of engineering, the book will also be useful to the practising engineers as reference.

#### KEY FEATURES

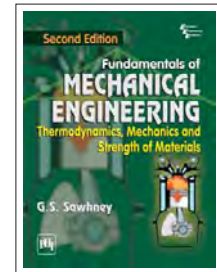
- Discusses statements with numerical examples
- Includes answers to the numerical problems at the end of the book
- Enhances learning of the basic working principles of electrical machines by using a number of supporting examples, review questions and illustrative examples

**CONTENTS:** Preface. Preface to the First Edition. Fundamentals of Electrical Energy. Circuit Analysis: Resistive Network. Circuit Analysis: Time Varying Excitation. Electrostatics. Electromagnetism and Electromechanical Energy Conversion. Measuring Instruments. Transformer. Direct Current Machines. Synchronous Machines. Three Phase Induction Motor. Special Purpose Electrical Machines. Analysis of Three Phase Circuits. Dynamic Response of Networks. Electrical Power System. Domestic Lighting. Answers to Exercises. Index.



Latest Print 2014 / 1064 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4895-0 / ₹ 695.00

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



**G.S. SAWHNEY** is Professor and Head, Mechanical Engineering Department at Greater Noida Institute of 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.

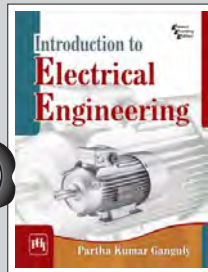
Latest Print 2010 / 844 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3776-3 / ₹ 495.00



## ENGINEERING

### Core Engineering

#### Introduction to Electrical Engineering



**PARTHA KUMAR GANGULI**, Associate Professor in the Department of Electrical Engineering, Shekhawati Engineering College, Dundlod, Jhunjhunu, Rajasthan.

Introduction to Electrical Engineering presents a comprehensive coverage of a broad range of key topics including principles and techniques, industrial applications, transformers and AC/DC machine operation. The book has an excellent blend of theory and solved examples.

Following a simple and engaging style, this book can be considered as a single source information meeting the requirements of the reader. It is intended for catering the needs of engineering students of all branches and eminently suited as a textbook for the students of B.E./B.Tech, AMIE and diploma courses in electrical engineering. Apart from this, the book would also be appreciated by all those students who are preparing for GATE and UPSC competitive examinations as well as by the practising engineers.

#### KEY FEATURES

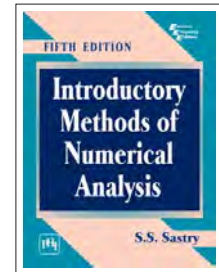
- Exclusive coverage of the syllabus prescribed for the undergraduate students of engineering.
- In-depth presentation of all key topics.
- Sufficient worked-out examples to support and reinforce concepts.
- Pedagogical features such as chapterwise key points to recall concepts and exercises as well as numerical problems will answers for practice.

**CONTENTS:** Preface. Acknowledgements. Fundamentals of Electricity. Circuit Analysis. Work, Power and Energy. Electromagnetism. Magnetic Circuits. Electromagnetic Induction. Single-phase AC Circuits. Three-phase AC Circuits. DC Machines (Generators and Motors). DC Generator. DC Motor. Transformer. AC Induction Motor. Alternator or Synchronous Generator. Synchronous Motors. Power Factor Improvement. Electrical Measuring Instruments and Measurements. Generation of Electrical Power. Fractional Horsepower Motor. Bibliography. Index.



Latest Print 2013 / 780 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4809-7 / ₹ 595.00

#### Introductory Methods of Numerical Analysis, 5th ed.



**S.S. SASTRY**, Formerly, Scientist/Engineer SF in the Applied Mathematics Division of Vikram Sarabhai Space Centre, Trivandrum.

This thoroughly revised and updated text, now in its fifth edition, continues to provide a rigorous introduction to the fundamentals of numerical methods required in scientific and technological applications, emphasizing on teaching students numerical methods and in helping them to develop problem-solving skills.

While the essential features of the previous editions such as References to MATLAB, IMSL, Numerical Recipes program libraries for implementing the numerical methods are retained, a chapter on Spline Functions has been added in this edition because of their increasing importance in applications.

This text is designed for undergraduate students of all branches of engineering.

#### NEW TO THIS EDITION

- Includes additional modified illustrative examples and problems in every chapter.
- Provides answers to all chapter-end exercises.
- Illustrates algorithms, computational steps or flow charts for many numerical methods.
- Contains four model question papers at the end of the text.

**CONTENTS:** Preface. Errors in Numerical Calculations. Solution of Algebraic and Transcendental Equations. Interpolation. Least Squares and Fourier Transforms. Spline Functions. Numerical Differentiation and Integration. Numerical Linear Algebra. Numerical Solution of Ordinary Differential Equations. Numerical Solution of Partial Differential Equations. Numerical Solution of Integral Equations. The Finite Element Method. Bibliography. Model Test Papers. Index.

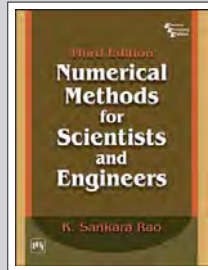
Latest Print 2013 / 464 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-4592-8 / ₹ 275.00



## ENGINEERING

### Core Engineering

#### Numerical Methods for Scientists and Engineers, 3rd ed.



**K. SANKARA RAO**, former Professor of Mathematics, Anna University, Chennai had earlier been Senior Scientist/Engineer, Applied Mathematics Division of Vikram Sarabhai Space Centre (VSSC), Trivandrum.

Primarily written as a textbook, this **third** edition provides a complete course on *numerical methods* for undergraduate students in all branches of engineering, postgraduate students in mathematics and physics, and students pursuing courses in Master of Computer Applications (MCA). Besides students, those appearing for competitive examinations, research scholars and professionals engaged in numerical computations, will treasure this edition for its in-depth analysis, systematic treatment and clarity of approach.

The third edition has been updated with new material comprising new methods and concepts and additional chapters on Boundary Value Problems and Approximation of Functions. It introduces the basics in computing, stresses on errors in computation, discusses various direct and iterative methods for solving algebraic and transcendental equations and a method for solving a system of nonlinear equations, linear system of equations, matrix inversion and computation of eigenvalues and eigenvectors of a matrix.

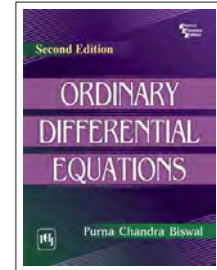
The book provides a detailed discussion on curve fitting, interpolation and cubic spline interpolation, numerical differentiation and integration. It also presents, various single step and predictor-corrector methods for solving ordinary differential equations, finite difference methods for solving partial differential equations with the concepts of truncation error and stability. Finally, it concludes with a treatment of numerical methods for solving boundary value problems, least squares, Chebyshev, Pade poly-nomial approximations and Fourier series approximation to a real continuous function.

**CONTENTS:** Preface. Preface to the Second Edition. Basics in Computing. Solution of Algebraic and Transcendental Equations. Solution of Linear System of Equations and Matrix Inversion. Eigenvalue Problems. Curve Fitting. Interpolation. Numerical Differentiation and Integration. Ordinary Differential Equations. Parabolic Partial Differential Equations. Elliptic Partial Differential Equations. Hyperbolic Partial Differential Equations. Boundary Value Problems. Approximation of Functions. Appendix. Bibliography. Answers to Exercises. Index.



Latest Print 2011 / 368 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-3217-1 / ₹ 275.00

#### Ordinary Differential Equations, 2nd ed.



**PURNA CHANDRA BISWAL**, Assistant Professor of Mathematics at Parala Maharaja Engineering College, Berhampur, Odisha.

This thoroughly revised text, now in its Second Edition, continues to provide a comprehensive treatment of the principal topics of ordinary differential equations, special functions and Laplace transform, and demonstrates the utility of the subject through a variety of applications to engineering problems.

The text provides detailed logical explanations of the subject's theoretical foundations, while at the same time helping students develop strong problem-solving skills. In addition, a large number of solved examples interspersed throughout the text help in providing the students with an in-depth insight into the underlying concepts and their applicability to solutions of problems in engineering and physical sciences.

The book is intended to serve as a textbook for undergraduate students of mathematics as well as all branches of engineering.

#### NEW TO THE SECOND EDITION

- Contains two new sections, one on Methods of Regrouping and another on Independent Functions.
- Includes numerous solved problems and chapter-end exercises with hints.

**CONTENTS:** Preface. Preface to the First Edition. Introduction. First Order Equations. First Order Equation Applications. Solution Existence and Uniqueness. Second Order Linear Equations. Second Order Equation Applications. Series Solutions. Special Differential Equations. Laplace Transform. Bibliography. Index.

Latest Print 2012 / 384 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4622-2 / ₹ 295.00

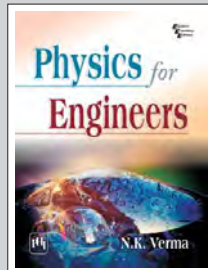


## ENGINEERING

### Core Engineering

#### Physics for Engineers

**N.K. VERMA**, *Senior Professor of Physics, School of Physics and Materials Science, Thapar University, Patiala. He has also been Registrar, Dean of Students Affairs, and Head of School of Physics and Materials Science in Thapar University.*



*Physics for Engineers* is designed to serve as a text for the first course in physics for engineering students of most of the technical universities in India. It can also be used as an introductory text for science graduates.

This book provides a clear, precise and accessible coverage of fundamentals of physics through succinct presentation, logical organization, and sound pedagogical order. Extensive care has been taken to apprise the students regarding the applied aspects of the concepts in physics. Most of the complex ideas are supported by explanatory figures to make the underlying concepts easy to understand and grasp. The text has some 275 such illustrations to reflect the concepts and aid the explanations. The wide range of topics this book covers, make it an excellent textbook for students as each chapter is relatively self-contained, and most of the chapters have practical utility.

Inside, you will find the chapter-end exercises, which remind you all the important facts you need to remember-fast!

If you want thorough understanding of the subject as well as edge on your peers, this is the book you need to follow.

The **Solution Manual** is also available for course instructors.

#### KEY FEATURES

- Well-planned 'Short Answer Questions' and 'Multiple Choice Questions'—To brush up the chapter fast, quickly and effectively especially before tests.
- Well-structured 'Solved Problems'—To illustrate the basic concepts.
- Ample 'Unsolved Problems' (with answers supplied)—To practice and confidence building.

**CONTENTS:** Preface. Special Theory of Relativity. Nuclear Physics. Quantum Physics. Elements of Crystallography. Free Electron Theory of Metals. Magnetic Materials. Superconductivity. Band Theory of Solids. Semiconductors. Dielectrics. Nanophysics. Electromagnetic Waves. Interference. Diffraction. Polarisation. Fibre Optics. Ultrasonics. Acoustics of Building. Oscillations. Appendices—A: Michelson-Interferometer: No Shift of Fringes. B: Acoustics of Buildings: Intensity Level. C: Acoustics of Buildings—Eyring's Formula: Sound Energy Reflected in Reflections. D: Newton's Rings Get Closer. Index.

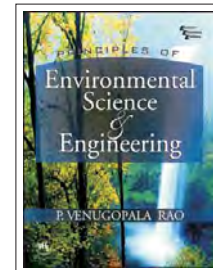
Latest Print 2013 / 596 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4849-3 / ₹ 495.00



PHI Learning: Publications

#### Principles of Environmental Science and Engineering



**P. VENUGOPALA RAO**, *Director, Sridevi Women's Engineering College, Hyderabad.*

Primarily intended as a text for undergraduate students of engineering for their core course in environmental studies, this book gives a clear introduction to the fundamental principles of ecology and environmental science and aptly summarizes the relationship between ecology and environmental engineering.

Divided into three parts, the book begins by discussing the biosphere, natural resources, ecosystems, biodiversity, and community health. Then it goes on to give detailed description on topics such as pollution and control, environmental management, and sustainable development. Finally, it focuses on environmental chemistry, environmental microbiology, and monitoring and analysis of pollutants.

#### KEY FEATURES

- Key words and summary at the end of each chapter provide the students an easy way of recapitulation.
- A large number of figures illustrate the topics discussed.
- Projects of environmental concern suggested at the end of the book enable the students to work in field projects.

Besides engineering students, undergraduate students in other streams, practicing engineers and professionals would find the text immensely useful.

**CONTENTS:** Preface. Part One: Ecosystems and Population Welfare—Biosphere. Natural Resources. Ecosystems. Biodiversity and Its Conservation. Community Health. Part Two: Pollution Control and Environmental Management—Pollution and Control. Environmental Concerns. Environmental Management. Sustainable Development. Part Three: Environmental Science—Environmental Chemistry. Environmental Microbiology. Monitoring and Analysis of Pollutants. Appendix. Glossary. General Questions for Study and Assignment. Index.

Latest Print 2012 / 288 pp. / 16.0 × 24.1 cm

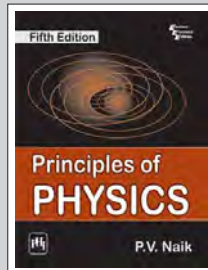
ISBN-978-81-203-2893-8 / ₹ 225.00



## ENGINEERING

### Core Engineering

#### Principles of Physics, 5th ed.



**P.V. NAIK**, *Department of Physics, VJTI, Mumbai.*

This well-received book, now in its fifth edition, presents the subject matter in a pedagogically sound manner with focus on teaching problem-solving. The specific needs of these students have influenced the selection of topics for inclusion in the book. The book provides students with a solid understanding of the fundamental concepts with due emphasis on developing skills to solve exercise problems aimed at both testing and extending the knowledge of the students.

Divided into 23 chapters, the book comprises topics on four major areas—mechanics, optics, electricity and electronics, and modern physics including quantum mechanics and lasers. In this fifth edition two new chapters on *Acoustics* and *Heat and Thermodynamics* are incorporated to widen the coverage and enhance the usefulness of this text.

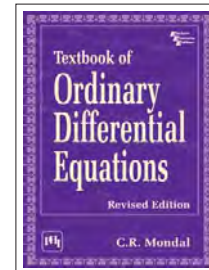
This book is intended for the undergraduate students of physics as well as for the first-year engineering students of several disciplines.

**CONTENTS:** Preface. Why to Study Physics. Motion. Work, Energy and Power. Potential Energy. Rotational Motion of Rigid Objects. Properties of Matter. Real Gas and Transport Processes in Gas. Thin Lens, Coaxial Systems and Aberrations. Spectra. Interference. Diffraction. Polarization. Direct Current Circuits. Alternating Current Circuits. Semiconductor Devices. Motion of a Charged Particle. Electrons, Isotopes and Nucleus. Quantum Theory. Atomic Structure. Quantum Mechanics. Laser. Optical Fibre. Acoustics. Heat and Thermodynamics. Appendix. Bibliography. Suggested Reading. Answers. Index.



Latest Print 2012 / 388 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4614-7 / ₹ 295.00

#### Textbook of Ordinary Differential Equations, Rev. ed.



**C.R. MONDAL**, *Lecturer, Department of Mathematics, North-Eastern Hill University, Shillong.*

Written in a clear, precise and readable manner, this textbook (now revised and corrected) is designed to provide postgraduate mathematics students with a sound and inspiring introduction to the main themes of ordinary differential equations. It is presented from the viewpoint of applied mathematics to treat differential equations both from the theoretical background and practical applications to scientific and engineering problems.

Beginning with a comprehensive treatment of linear differential equations with variable coefficients, the text gives a detailed discussion on some well-known special functions which provide solutions of second-order linear ordinary differential equations having several regular singular points. Many of the standard concepts and methods which are useful in the study of special functions are discussed. The properties of special functions are derived from their differential equations and boundary conditions. Finally, existence and uniqueness of solutions of differential equations are established.

Worked-out examples are introduced throughout the text. End-of-chapter exercises further help understand the mathematical and physical structure of the subject.

**CONTENTS:** Preface. Introduction. Linear Differential Equations with Variable Coefficients. Hypergeometric Equations. Legendre Equation. Bessel Equation. Modified Bessel Functions and Asymptotic Expansions. Existence and Uniqueness for Solutions of Ordinary Differential Equations. References. Answers to Exercises. Index.

Latest Print 2009 / 192 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-3467-0 / ₹ 175.00

## ENGINEERING

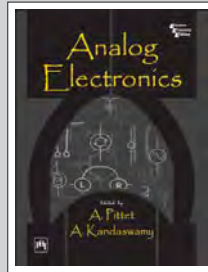
### Electrical/Electronics (ANALOG/DIGITAL ELECTRONICS)

#### Analog Electronics

Edited by

**A. PITTET**, Chief Technical Advisor,  
Centre for Electronics Design and  
Technology (CEDT), Indian Institute  
of Science (IISc.), Bangalore.

**A. KANDASWAMY**, Professor and  
Dean, Department of Electrical  
Sciences, PSG College of Technology,  
Coimbatore.



The recent growth of industrial automation as well as wireless communication has made the Analog Electronics course even more relevant in today's undergraduate programmes. This well-written text offers a comprehensive introduction to the concepts of circuit analysis, electronic devices and analog integrated circuits. The primary aim of this textbook is to raise the analytical skills of students, required for the analysis and design of analog electronic circuits.

This book exposes the students to the current trends in Analog Electronics including the complete analysis and design of electronic circuit using Diodes, BJTs, FETs, MOSFETs, CMOS and operational amplifiers.

#### KEY FEATURES

- Presents various models/equivalent circuits of semiconductor devices required for analysis and simulations.
- Incorporates PSPICE™ modelling and simulation examples in each chapter.
- Each chapter starts with an Introduction and specific learning objectives, and concludes with a summary.
- Each chapter contains large number of worked-out examples, exercises and numerical problems.

Primarily intended for the undergraduate students of Electrical, Electronics, Communication and Computer Engineering, this book would also be useful to the practising engineers, who wish to update their knowledge in the area of Analog Electronics Circuit Design.

**CONTENTS:** From the Editor's Desk. Preface. Acknowledgements. Notations Used in this Book. Review of Basic Devices and Circuits. Field Effect Transistors. Small Signal Models. Frequency Response of Small Signal Amplifiers. Large Signal Amplifiers. Feedback Amplifiers. Operational Amplifiers. Answers to Objective Questions. Appendices—A: History of Devices. B: Two-port Network Parameters. C: Introduction to PSPICE™. D: Electrostatic Potential and Charge Distribution in Silicon. E: Table of Constants and Standards. Glossary. Bibliography. Index. Authors' Profiles.

Latest Print 2009 / 376 pp. / 17.8 × 23.5 cm

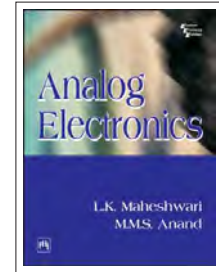


ISBN-978-81-203-2784-9 / ₹ 250.00

#### Analog Electronics

**L.K. MAHESHWARI**, Professor of  
Electronics and Instrumentation at  
Birla Institute of Technology &  
Science, Pilani. Presently, he also  
holds the position of Vice-Chancellor  
of the Institute.

**M.M.S. ANAND**, Professor of  
Electronics and Instrumentation at  
Birla Institute of Technology & Science, Pilani. Presently, he also  
holds the position of Registrar of the Institute.



This text offers a comprehensive introduction to a wide, relevant array of topics in analog electronics. It is intended for students pursuing courses in electrical, electronics, computer, and related engineering disciplines.

Beginning with a review of linear circuit theory and basic electronic devices, the text moves on to present a detailed, practical understanding of many analog integrated circuits. The most commonly used analog IC to build practical circuits is the operational amplifier or op-amp. Its characteristics, basic configurations and applications in the linear and nonlinear circuits are explained. Modern electronic systems employ signal generators, analog filters, voltage regulators, power amplifiers, high frequency amplifiers and data converters. Commencing with the theory, the design of these building blocks is thoroughly covered using integrated circuits.

The development of microelectronics technology has led to a parallel growth in the field of Microelectromechanical Systems (MEMS) and Nanoelectromechanical Systems (NEMS). The IC sensors for different energy forms with their applications in MEMS components are introduced in the concluding chapter.

Several computer-based simulations of electronic circuits using PSPICE are presented in each chapter. These examples together with an introduction to PSPICE in an Appendix provide a thorough coverage of this simulation tool that fully integrates with the material of each chapter. The end-of-chapter problems allow students to test their comprehension of key concepts. The answers to these problems are also given.

**CONTENTS:** Preface. Fundamental Concepts. Operational Amplifier Basics. Special Purpose Linear Op-amp Circuits. Active Filters. Nonlinear Operational Amplifier Circuits. Signal Generators. Voltage Regulators. Integrated Circuit Power Amplifiers. High Frequency Amplifiers. Data Converters. IC Sensors. Appendix. Answers to Problems. Bibliography. Index.

Latest Print 2012 / 704 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-2722-1 / ₹ 395.00

## ENGINEERING

### Electrical/Electronics (ANALOG/DIGITAL ELECTRONICS)

#### Digital Logic and Computer Organization

**V. RAJARAMAN**, *Honorary Professor, Supercomputer Education and Research Centre, Indian Institute of Science, Bangalore.*

**T. RADHAKRISHNAN**, *Professor of Computer Science and Software Engineering in the Faculty of Engineering, Concordia University in Montreal.*



This introductory text on 'digital logic and computer organization' presents a logical treatment of all the fundamental concepts necessary to understand the organization and design of a computer. It is designed to cover the requirements of a first-course in computer organization for undergraduate Computer Science, Electronics, or MCA students. Beginning from first principles, the text guides students through to a stage where they are able to design and build a small computer with available IC chips.

Starting with the foundation material on data representation, computer arithmetic and combinatorial and sequential circuit design, the text explains ALU design and includes a discussion on an ALU IC chip. It also discusses Algorithmic State Machine and its representation using a Hardware Description Language before shifting to computer organization.

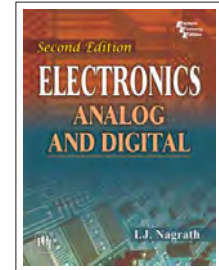
The evolutionary development of a small hypothetical computer is described illustrating hardware-software trade-off in computer organization. Its instruction set is designed giving reasons why each new instruction is introduced. This is followed by a description of the general features of a CPU, organization of main memory and I/O systems. The book concludes with a chapter describing the features of a real computer, namely the Intel Pentium. An appendix describes a number of laboratory experiments which can be put together by students, culminating in the design of a toy computer.

**CONTENTS:** Preface. Data Representation. Boolean Algebra and Logic Gates. Combinatorial Switching Circuits. Sequential Switching Circuits. Arithmetic and Logic Unit. Application of Sequential Circuits. Computer Systems—Multiple Views. Basic Computer Organization. Central Processing Unit. Memory Organization. Input-output Devices. Input-Output Organization. Case Study of a Real Computer System. **Appendix**—A. Suggested Hardware Lab Experiments. B. Decision Table Terminology. References. Index.



Latest Print 2011 / 528 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2979-9 / ₹ 295.00

#### Electronics: Analog and Digital, 2nd ed.



**I.J. NAGRATH**, *has been Professor and Deputy Director, Birla Institute of Technology and Science, Pilani.*

The second edition of this book has been updated and enlarged, especially the chapters on digital electronics. In the analog part, several additions have been made wherever necessary. Also, optical devices circuits have been introduced. Analog electronics spans semiconductors, diodes, transistors, small and large-signal amplifiers, OPAMPs and their applications. Both BJT and JFET, and MOSFET are treated parallelly so as to highlight their similarities and dissimilarities for thorough understanding of their parameters and specifications. The digital electronics covers logic gates, combinational circuits, IC families, number systems codes, adders/subtractors, flip-flops, registers and counters. Sequential circuits, memories and D/A and A/D convertor circuits are especially stressed. Fabrication technology of integrated devices and circuits have also been dealt with. Besides, many new examples and problems have been added section-wise.

The text is written in simple yet rigorous manner with profusion of illustrative examples as an aid to clear understanding. The student can self-study several portions of the book with minimal guidance.

A solution manual is available for the teachers.

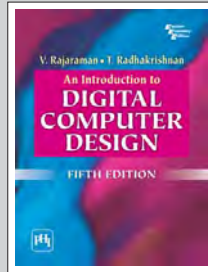
**CONTENTS:** Preface. Preface to the First Edition. Semiconductors, Diodes and Diode Circuits. Transistors and Integrated Circuits. Small-Signal Models, Amplification and Biasing. Small-Signal Amplifiers Frequency Response. Large-Signal Amplifiers. Feedback Amplifiers and Oscillators. Operational Amplifiers. Digital Logic and Circuits. Number Systems, Boolean Algebra and Combinational Circuits. Sequential Circuits and Systems. Multivibrators Clocks and Power Supply Regulators. The Digital Computer. Cathode-Ray Tube. Bibliography. Answers to Problems. Index.

Latest Print 2013 / 808 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4802-8 / ₹ 475.00

## ENGINEERING

### Electrical/Electronics (ANALOG/DIGITAL ELECTRONICS)

#### Introduction to Digital Computer Design, An, 5th ed.



**V. RAJARAMAN**, *Honorary Professor, Supercomputer Education and Research Centre, Indian Institute of Science, Bangalore.*

**T. RADHAKRISHNAN**, *Professor of Computer Science and Software Engineering, Faculty of Engineering at Concordia University, Montreal, Canada.*

This well-received book, now in **fifth edition**, has been thoroughly revised and updated with new material on CMOS gates, MSI/ALU and Pentium5 architecture. The chapter on Cache and Virtual Memory has been rewritten. A new chapter on Parallel Computers has been added.

The first part of the book is devoted to digital techniques used in the design of digital circuits and small digital systems. The second part deals with logical organization and architecture of computers. It also describes a small hypothetical computer to illustrate how instruction sets are evolved. Real computers (namely, Pentium and MIPS machines) are described and compared with the hypothetical computer. The remainder of this part describes I/O devices, cache and virtual memory and parallel computers.

The book does not assume extensive knowledge of electronics or mathematics. A knowledge of programming in C or Java would be useful to give the student a proper perspective to appreciate the development of the subject. This textbook is suitable for B.Sc. (Electronics) and B.Tech. courses. Both the parts of the book are self-contained and may be used independently, if appropriate.

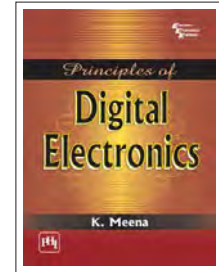
**CONTENTS:** Preface. Part I: Digital Techniques and Design—Data Representation. Arithmetic Operations. An Algebra for Digital Systems. Combinatorial Switching Circuits. Sequential Switching Circuits. Selected Examples of Digital Systems. Memory Organization. Part II: Logical Organization and Architecture—A Small Computer Organization. Central Processing Unit. Input-Output Devices. Input-Output Organization. Cache and Virtual Memory. Parallelism in Computing. Appendix: Decision Table Terminology. Index.

Latest Print 2012 / 528 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3409-0 / ₹ 325.00



#### Principles of Digital Electronics



**K. MEENA**, *Professor of Computer Science and Engineering, Principal and Head, Department of Computer Science at the Shrimati Indira Gandhi College, Tiruchirapalli.*

This book teaches the basic principles of digital circuits. It is appropriate for an introductory course in digital electronics for the students of:

- B.Sc. (Computer Science)
- B.Sc. (Electronics)
- B.Sc. (Information Technology)
- B.Sc. (Physics)
- Bachelor of Computer Applications (BCA)
- Postgraduate Diploma in Computer Applications
- Master of Computer Applications (MCA)

The book emphasizes the *must know* concepts that should be covered in an introductory course and provides an abundance of clearly explained examples, so essential for a thorough understanding of the principles involved in the analysis and design of digital computers. The book takes students step-by-step through digital theory, focusing on:

- Number representation systems and codes for representing information in digital systems
- Use of logic gates in building digital circuits
- Basic postulates and theorems of Boolean algebra
- Karnaugh map method for simplifying Boolean functions
- Arithmetic circuits such as adders and subtractors
- Combinational circuit building blocks such as multiplexers, decoders and encoders
- Sequential circuit building blocks such as flip-flops, counters and registers
- Operation of memory elements such as RAM, DRAM, magnetic disk, magnetic bubble, optical disk, etc.

**CONTENTS:** Preface. Number Systems and Codes. Logic Gates and Circuits. Boolean Algebra. Combinational Logic Circuits. Sequential Logic Circuits. Counters and Shift Registers. Memory Elements. Index.

Latest Print 2013 / 288 pp. / 16.0 × 24.1 cm

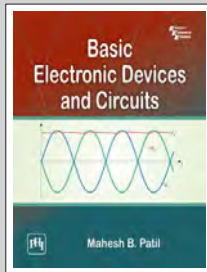
ISBN-978-81-203-3270-6 / ₹ 275.00



## ENGINEERING

### Electrical/Electronics (BASIC ELECTRONICS)

#### Basic Electronic Devices and Circuits



**MAHESH B. PATIL** worked at the Central Research Lab, Hitachi (1993) and at IIT Kanpur (1994–1999), prior to joining IIT Bombay in 1999 where he is currently a Professor.

This book provides detailed fundamental treatment of the underlying physics and operational characteristics of most commonly used semiconductor devices, covering diodes and bipolar transistors, optoelectronic devices, junction field-effect transistors, and MOS transistors. In addition, basic circuits utilising diodes, bipolar transistors, and field-effect transistors are described, and examples are presented which give a good idea of typical performance parameters and the associated waveforms.

A brief history of semiconductor devices is included so that the student develops an appreciation of the major technological strides that have made today's IC technology possible. Important concepts are brought out in a simple and lucid manner rather than simply stating them as facts. Numerical examples are included to illustrate the concepts and also to make the student aware of the typical magnitudes of physical quantities encountered in practical electronic circuits. Wherever possible, simulation results are included in order to present a realistic picture of device operation. Fundamental concepts like biasing, small-signal models, amplifier operation, and logic circuits are explained. Review questions and problems are included at the end of each chapter to help students test their understanding.

The book is designed for a first course on semiconductor devices and basic electronic circuits for the undergraduate students of electrical and electronics engineering as well as for the students of related branches such as electronics and communication, electronics and instrumentation, computer science and engineering, and information technology.

**CONTENTS:** Preface. A Sense of Scale. Carrier Statistics and Transport.  $pn$  Junction Diodes:  $I$ - $V$  Curve.  $pn$  Junction Diodes: AC and Transient Conditions. Optoelectronic  $pn$  Junction Diodes. Diode Circuits. Bipolar Junction Transistors. BJT Amplifiers. Junction Field-Effect Transistors. MOS Transistors. Appendices—A:  $pn$  Junction: Band Diagram Including Contacts. B: Small-signal Diode Model under Forward Bias. C: BJT  $h$  Parameters. References. Suggested Reading. Index.

Latest Print 2013 / 384 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4729-8 / ₹ 325.00



#### Basic Electronics: Devices, Circuits and IT Fundamentals



**SANTIRAM KAL**, Professor, Department of Electronics and Electrical Communication Engineering, Indian Institute of Technology Kharagpur.

This comprehensive and well-organized text discusses the fundamentals of electronic communication, such as devices and analog and digital circuits, which are so essential for an understanding of digital electronics. Professor Santiram Kal, with his wealth of knowledge and his years of teaching experience, compresses, within the covers of a single volume, all the aspects of electronics—both analog and digital—encompassing devices such as microprocessors, microcontrollers, fibre optics, and photonics. In so doing, he has struck a fine balance between analog and digital electronics.

A distinguishing feature of the book is that it gives case studies in modern applications of electronics, including information technology, that is, DBMS, multimedia, computer networks, Internet, and optical communication.

Worked-out examples, interspersed throughout the text, and the large number of diagrams should enable the student to have a better grasp of the subject. Besides, exercises, given at the end of each chapter, will sharpen the student's mind in self-study. These student-friendly features are intended to enhance the value of the text and make it both useful and interesting.

**CONTENTS:** Preface. Acknowledgements. An Introduction to Electronics. Semiconductors, Materials and Junction Diodes. Junction Diodes and Their Applications. BJTs and FETs. Transistor Biasing and Small Signal Amplifiers. Feedback Amplifiers and Oscillators. Operational Amplifiers. Digital Logic and Combinational Circuits. Sequential Logic Circuits. Analog-to-Digital and Digital-to-Analog Conversion. Data Acquisition Systems. Memory Systems. Microcomputers and Microprocessors. Communication Systems. Fibre Optics and the Information Age. Fundamentals of Information Technology. Bibliography. Select Answers to Objective-type Questions and Numerical Problems. Index.

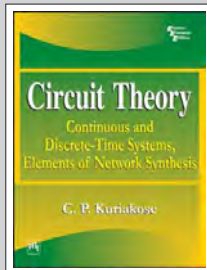
Latest Print 2013 / 584 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-1952-3 / ₹ 350.00

## ENGINEERING

### Electrical/Electronics (BASIC ELECTRONICS)

#### Circuit Theory: Continuous and Discrete-Time Systems, Elements of Network Synthesis



**C.P. KURIAKOSE**, is Consultant to the OEN Group of Companies, Director of Guardian Controls Ltd., Cochin and a Visiting Professor of Electrical Engineering, Govt. Model Engineering College, Cochin.

This book is designed to meet a felt need for a concise but systematic and rigorous presentation of Circuit Theory which forms the core of electrical engineering.

The book is presented in four parts: Fundamental concepts in electrical engineering, Linear-time invariant systems, Advanced topics in network analysis, and Elements of network synthesis. A variety of illustrative examples, solved problems and exercises carefully guide the student from basic of electricity to the heart of circuit theory, which is supported by the mathematical tools of transforms. The inclusion of a chapter on PSpice and MATLAB is sure to whet the interest of the reader for further exploration of the subject—especially the advanced topics.

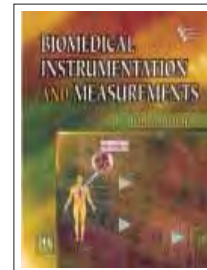
Intended primarily as a textbook for the undergraduate students of electrical, electronics, and computer science engineering, this book would also be useful for postgraduate students and professionals for reference and revision of fundamentals. The book should also serve as a source book for candidates preparing for examinations conducted by professional bodies like IE, IETE, IEEE.

**CONTENTS:** List of Tables. Foreword. Preface. Acknowledgements. Part 1: Fundamental Concepts in Electrical Engineering—Circuit Variables. Circuit Elements. Network Laws. Network Theorems. Alternating Current Circuit. Part 2: Linear Time-invariant (LTI) Systems—Techniques of Circuit Analysis. Network Topology. Differential Equations—Solution by Classical Methods. Laplace Transforms in Network Analysis. Steady State Sinusoidal Response of Higher Order Networks. Terminal Characteristics of Networks. Network Functions. Wave Filters—Frequency Selective Circuits. Fourier Series and Fourier Transforms. Network Analysis Using PSpice and MATLAB. Part 3: Advanced Topics in Network Analysis—State Variable Analysis. Digital Systems and  $z$ -Transforms. Non-Linear Systems. Part 4: Elements of Network Synthesis—Network Synthesis. Appendices—A: Matrices and Determinants. B: Complex Variables. C: Operational Amplifiers. D: Coupled Circuits and the Transformer. Review Problems. References. Index.

Latest Print 2011 / 528 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2643-9 / ₹ 350.00

### Electrical/Electronics (BIOMEDICAL INSTRUMENTATION)

#### Biomedical Instrumentation and Measurements



**R. ANANDANATARAJAN**, Professor and Head, Department of Electronics and Instrumentation Engineering, Pondicherry Engineering College, Puducherry.

Designed as a text for the undergraduate students of instrumentation, electrical, electronics and biomedical engineering, it covers the entire range of instruments and their measurement methods used in the medical field. The functions of the biomedical instruments and measurement methods are presented keeping in mind those students who have minimum required knowledge of human physiology.

The purpose of this book is to review the principles of biomedical instrumentation and measurements employed in the hospital industry. Primary emphasis is laid on the method rather than micro level mechanism. This book serves two purposes: One is to explain the mechanism and functional details of human body, and the other is to explain how the biological signals of human body can be acquired and used in a successful manner.

**CONTENTS:** Preface. Electronics and Medicine. Bioelectric Potentials and Transducers. Bioelectric Signal Acquisition. The Nervous System. The Cardiovascular System. Pulmonary/Respiratory Systems. Biotelemetry. Electrical Safety of Medical Equipments and Patients. Medical Imaging Systems. Therapeutic Units and Analytical Instruments. Index.

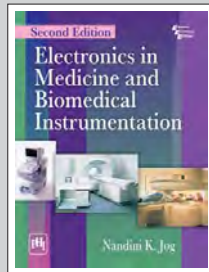
Latest Print 2013 / 304 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4227-9 / ₹ 295.00



## ENGINEERING

### Electrical/Electronics (BIOMEDICAL INSTRUMENTATION)

#### Electronics in Medicine and Biomedical Instrumentation, 2nd ed.



**NANDINI K. JOG** an Adjunct Professor, Department of Electronics Engineering, Mukesh Patel School of Technology Management and Engineering, NMIMS University, Mumbai.

Medical electronics is using vast and varied applications in numerous spheres of human endeavour—ranging from communication, biomedical engineering to re-creational activities. This book in its second edition continues to give a detailed insight into the basics of human physiology. It also educates the readers about the role of electronics in medicine and the various state-of-the-art equipments being used in hospitals around the world.

The text presents the reader with a deep understanding of the human body, the functions of its various organs, and then moves on to the biomedical instruments used to decipher with greater precision the signals in relation to the body's state of well-being. The book incorporates the latest research and developments in the field of biomedical instrumentation. Numerous diagrams and photographs of medical instruments make the book visually appealing and interesting.

Primarily intended as a text for the students of Electronics and Instrumentation Engineering and Biomedical Engineering, the book would also be of immense interest to medical practitioners.

#### NEW TO THIS EDITION

- Magnetoencephalography (MEG) and features of Mediscope software used for medical imaging
- Topics on optical fiber transducers, and fiber optic microphones used in MRI scanning
- Discusses in detail the medical instruments like colorimeter, spectro-photometer and flame photometry and auto analyzers for the study of toxic levels in the body
- Includes a detailed description of pacemakers and defibrillators, and tests like Phonocardiography, Vector Cardiography, Nuclear stress test, MRI stress test
- Addition of the procedure of dialysis, hemodialysis and peritoneal dialysis

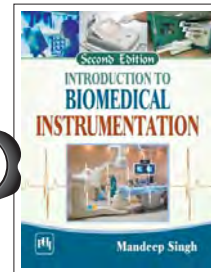
**CONTENTS:** Preface. Introduction to Biomedical Instrumentation. Transducers, Amplifiers, Recorders and Displays. Blood. Cardiovascular System or Circulatory System. Nervous System. Respiratory and Other Measurements. Imaging Techniques. Bibliography. Index.

Latest Print 2013 / 208 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4724-3 / ₹ 250.00



#### Introduction to Biomedical Instrumentation, 2nd ed.

**MANDEEP SINGH**,  
Associate Professor,  
Department of Electrical and  
Instrumentation Engineering,  
Thapar University, Patiala.



Primarily intended as a textbook for the undergraduate students of Instrumentation, Electronics, and Electrical Engineering for a course in biomedical instrumentation as part of their programmes. The book presents a detailed introduction to the fundamental principles and applications of biomedical instrumentation.

The book familiarizes the students of engineering with the basics of medical science by explaining the relevant medical terminology in simple language. Without presuming prior knowledge of human physiology, it helps the students to develop a substantial understanding of the complex processes of functioning of the human body. The mechanisms of all major biomedical instrumentation systems—ECG, EEG, CT scanner, MRI machine, pacemaker, dialysis machine, ultrasound imaging machine, laser lithotripsy machine, defibrillator, and plethysmograph—are explained comprehensively. A large number of illustrations are provided throughout the book to aid in the development of practical understanding of the subject matter. Chapter-end review questions help in testing the students' grasp of the underlying concepts.

The second edition of the book incorporates detailed explanations to action potential supported with illustrative example and improved figure, ionic action of silver-silver chloride electrode, and isolation amplifiers. It also includes mathematical treatment to ultrasonic transit time flowmeters. A method to find approximate axis of heart and image reconstruction in CT scan is explained with simple examples. A topic on MRI has been simplified for clear understanding and a new section on Positron Emission Tomography (PET), which is an emerging tool for cancer detection, has been introduced.

**CONTENTS:** Preface. Introduction to Biomedical Instrumentation. Bio-Potential Electrodes, Amplifiers and Measurement Systems. Cardiovascular Measurements. Respiratory System Measurements. Neuromuscular and Nervous Measurements. Sensory and Behavioural Measurements. Clinical Laboratory Instruments. Biomedical Imaging Techniques. Therapeutic Equipment. Patient Monitoring System. Patient Safety and Biomedical Equipment. Role of Lasers in Healthcare. Prostheses and Artificial Organs. Telemedicine and Medical Informatics. Suggested Further Reading. Index.

Latest Print 2014 / 248 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-5023-6 / ₹ 250.00

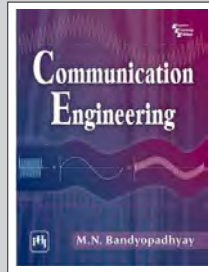


## ENGINEERING

**Electrical/Electronics** (COMMUNICATION SYSTEMS)

**Electrical/Electronics** (COMMUNICATION/MICROWAVE)

### Communication Engineering



**M.N. BANDYOPADHYAY**, Director, National Institute of Technology (NIT) Kurukshetra.

This compact and student-friendly text offers a comprehensive introduction to several topics of communication engineering, imparting a thorough grounding in the fundamental concepts of modulation and demodulation, radio communication, telecommunication, radar, television, network management in communication, and advances in communication. It explains the basic theory of operation and applications. The main objective of this text is to provide the students with a clear understanding of the principles of communication engineering, aided by several diagrams and solved numerical problems.

#### DISTINGUISHING FEATURES

- A number of solved examples to reinforce the concepts
- Concept are explained with block diagrams for better understanding
- Numerous objective type questions (around 400) are provided in the Appendix

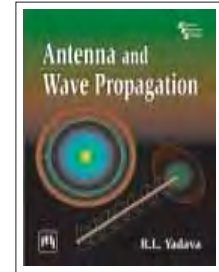
The book is primarily addressed to the needs of the undergraduate students of electrical and electronics, electronics and communication engineering and telecommunication engineering.

**CONTENTS:** Preface. Introduction. Modulation and Demodulation. Radio Communication. Telecommunication. Radar. Television. Network Management in Communication. Advanced Communication. Appendix. Index.

Latest Print 2013 / 352 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3962-0 / ₹ 295.00



### Antenna and Wave Propagation



**R.L. YADAVA**, Professor in the Department of Electronics and Communication Engineering, Galgotias College of Engineering and Technology, Greater Noida, Uttar Pradesh.

This book is designed to serve as a text for BE/BTech students of Electronics and Communication Engineering and for MTech students of Communication Engineering. It provides a thorough understanding of the fundamentals and applications of the subject. The book discusses the properties of several types of antennas such as dipoles, loop, Yagi, log-periodic and microstrip antennas and lucidly explains the phenomenon of wave propagations with emphasis on theory of operation and design procedures. It provides a comprehension of the principles of radiation and methods of excitation. The book also focuses on antenna measurements along with necessary requirements and different methods of measurement.

Written in an easy-to-understand manner, the text includes several illustrative examples. A large number of solved examples and exercise problems with varying difficulty levels are included to reinforce the theoretical understanding of concepts. The book also contains several objective-type questions in each chapter. The Appendices provide a rich source of information and expressions as well as design data.

**CONTENTS:** Preface. Introduction. Electromagnetic Waves and Radiation. Antenna Fundamentals and Parameters. Antenna Array. Linear Wire Antennas. Loop Antennas. Metal-Plate Lens Antennas. Parabolic Reflector Antennas. Yagi Antenna. Log-periodic Antenna. Horn and Cone Antennas. Helical Antenna. Microstrip Antenna. Surface Wave Propagation. Tropospheric and Space Wave Propagation. Ionospheric Propagation. Antenna Measurements. Review Questions. Question Bank with Solutions. Appendices. Glossary. Index.

Latest Print 2013 / 748 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4291-0 / ₹ 525.00



## ENGINEERING

Electrical/Electronics (COMMUNICATION/MICROWAVE)

### Communication Protocol Engineering, 2nd ed.

**P. VENKATARAM**, Professor in Department of Electrical Communication Engineering, Indian Institute of Science (IISc), Bangalore.

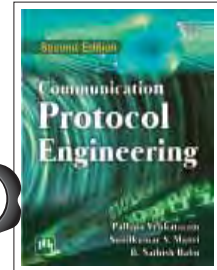
**SUNILKUMAR S. MANVI**, Professor and Head, Department of Electronics and Communication Engineering, Reva Institute of Technology and Management, Bangalore.

**B. SATHISH BABU**, Professor and Head, Department of Computer Science and Engineering, Siddaganga Institute of Technology, Tumkur.

This well accepted book, now in its second edition, is a time-honoured revision and extension of the previous edition.

With improved organization and enriched contents, the book primarily focuses on the concepts of design development of communication protocols or communication software. Beginning with an overview of protocol engineering, the text analyzes important topics such as

- TCP/IP suite protocol structure.
- Protocol specification.
- Protocol specification languages like SDL, SPIN, Estelle, E-LOTOS, CPN, UML, etc.
- Protocol verification and validation techniques like semantic models and reachability analysis.
- Generating conformance test suite and its application to a running protocol implementation.



*Communication Protocol Engineering* is purely a text dedicated to the undergraduate students of electronics and communication engineering and computer engineering. The text is also of immense use to the postgraduate students of communication systems.

#### HIGHLIGHTS OF SECOND EDITION

- Incorporates latest and up-to-date information on the topics covered.
- Includes a large number of figures and examples for easy understanding of concepts.
- Presents some new sections like wireless protocol challenges, TCP protocol, verification of TCP, test execution, test case derivation, etc.
- Involves extension of protocol specification languages like SPIN, Estelle, UPPAAL etc.

**CONTENTS:** List of Figures. List of Tables. Preface. Introduction. Network Reference Model. Protocol Specification. Protocol Specification Languages. Protocol Verification/Validation. Communication Protocol Conformance Testing. Protocol Performance Testing. Protocol Synthesis. Protocol Implementation. Assignments. References. Index.

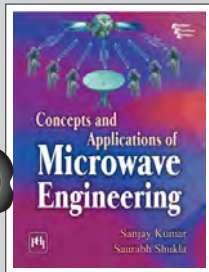
Latest Print 2014 / 336 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4903-2 / 350.00



## ENGINEERING

Electrical/Electronics (COMMUNICATION/MICROWAVE)

### Concepts and Applications of Microwave Engineering



**SANJAY KUMAR**, Air Commodore at IAF, 9BRD, Pune.  
**SAURABH SHUKLA**, Scientist, Defence Avionics Research Establishment (DARE), DRDO, Bangalore.

The book is primarily designed to cater to the needs of undergraduate and postgraduate students of Electronics and Communication Engineering and allied branches. The book has been written keeping average students in mind.

This well-organised and lucidly written text gives a comprehensive view of microwave concepts covering its vast spectrum, transmission line, network analysis, microwave tubes, microwave solid-state devices, microwave measurement techniques, microwave antenna theories, radars and satellite communication.

#### KEY FEATURES

- A fairly large number of well-labelled diagrams provides practical understanding of the concepts.
- Solved numerical problems aptly crafted and placed right after conceptual discussion provide better comprehension of the subject matter.
- Chapter summary highlights important points for quick recap and revision before examination.
- About 200 MCQs with answers help students to prepare for competitive examinations.
- Appropriate number of unsolved numerical problems with answers improves problem solving skill of students.
- Simplified complex mathematical derivations by synthesising them in smaller parts for easy grasping.

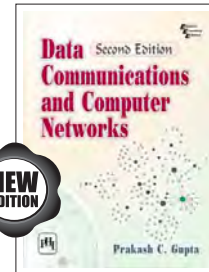
**CONTENTS:** Preface. Acknowledgements. Introduction to Microwaves. Transmission Lines and Waveguides. Planar Transmission Lines. Network Analysis and Microwave Passive Components. Microwave Tube Based Amplifiers. Microwave Solid State Amplifiers. Microwave Measurements. Antenna Systems. Radar Systems. Satellite Communication. Index.

Latest Print 2014 / 356 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4935-3 / ₹ 325.00



### Data Communications and Computer Networks, 2nd ed.



**PRAKASH C. GUPTA**, Head,  
Department of Information  
Technology, Maharashtra Institute  
of Technology, Pune.

Primarily intended as a text for undergraduate courses in Electronics and Communications Engineering, Computer Science, IT courses, and Computer Applications, this up-to-date and accessible text gives an indepth analysis of data communications and computer networks in an easy-to-read style. Though a new title, it is a completely revised and fully updated version of the author's earlier book *Data Communications*. The rapid strides made during the last decade in the fields of data communication and networking, and the close link between these two subjects have prompted the author to add several chapters on computer networks in this text.

The book gives a masterly analysis of topics ranging from the principles of data transmission to computer networking applications. It also provides standard protocols, thereby enabling to bridge the gap between theory and practice. What's more, it correlates the network protocols to the concepts, which are explained with the help of **numerous examples** to facilitate students' understanding of the subject.

This well-organized text presents the **latest developments** in the field and details **current topics** of interest such as Multicasting, MPLS, IPv6, Gigabit Ethernet, IPsec, SSL, Auto-negotiation, Wireless LANs, Network security, Differentiated services, and ADSL.

Besides students, the practicing professionals would find the book to be a valuable resource.

The book, in its second edition introduces a full chapter on *Quality of Service*, highlighting the meaning, parameters and functions required for quality of service.

**CONTENTS:** Preface. Data Communication Concepts and Terminology. Transmission Media. Telephone Network. Data Line Devices. Error Control. Network Architecture.. The Physical Layer. The Data Link Layer. Data Link Protocols. Local Area Networks. IEEE 802.3 Ethernet. Token Passing Local Area Networks. Wireless Local Area Networks. Bridges and Layer-2 Switches. Network Layer. Virtual Circuit Packet Switching Network. Internet Protocol (IP). Routing Protocols. Multicasting and Multiprotocol Label Switching (MPLS). Transport Layer. Network Security. Application Layer. Quality of Service. Bibliography. Answers to Selected Exercises. List of Acronyms. Index.

Latest Print 2013 / 832 pp. / 17.8 × 23.5 cm

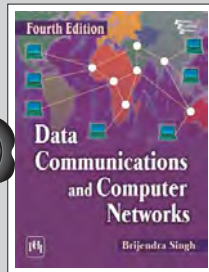
ISBN-978-81-203-4864-6 / ₹ 495.00



## ENGINEERING

Electrical/Electronics (COMMUNICATION/MICROWAVE)

### Data Communications and Computer Networks, 4th ed.



**BRIJENDRA SINGH**, Professor and Head, Department of Computer Science, University of Lucknow.

This fully revised and updated book, now in its Fourth Edition, continues to provide a comprehensive coverage of data communications and computer networks in an easy to understand style. The text places as much emphasis on the application of the concepts as on the concepts themselves. While the theoretical part is intended to offer a solid foundation of the basics so as to equip the student for further study, the stress on the applications is meant to acquaint the student with the realistic status of data communications and computer networks as of now.

Intended primarily as a textbook for the students of computer science and engineering, electronics and communication engineering, master of computer applications (MCA), and those offering IT courses, this book would also be useful for practising professionals.

#### NEW TO THIS EDITION

- Three new chapters on:
  - Network Architecture and OSI Model
  - Wireless Communication Technologies
  - Web Security
- Appendix on Binary and Hexadecimal Numbering

#### KEY FEATURES

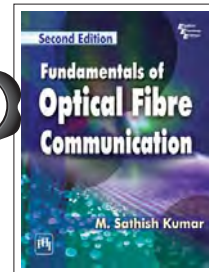
- Illustrates the application of the principles through highly simplified block diagrams.
- Contains a comprehensive glossary which gives simple and accurate descriptions of various terms.
- Provides Questions and Answers at the end of the book which facilitate quick revision of the concept.

**CONTENTS:** Preface. Preface to the First Edition. Introduction. Network Architecture and OSI Model. Communication Media and Data Transmission. Error Detection and Correction. Data Compression. Data Link Control and Protocol Concepts. Local Area Networks. Wide Area Networks. Integrated Services and Routing Protocols. Wireless LANs. Wireless Communication Technologies. Internetworking. TCP Reliable Transport Service. Network Applications. Network Management. Network Security. Web Security. Appendices—1: ASCII Code. 2: Binary and Hexadecimal Numbering. 3: Abbreviations and Acronyms. 4: Questions and Answers on Networking. 5: Contact Addresses for Various Organizations. Glossary of Terms. Bibliography. Index.

Latest Print 2014 / 480 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4907-0 / ₹ 395.00



### Fundamentals of Optical Fibre Communication, 2nd ed.



**M. SATHISH KUMAR**, Professor in the Electronics and Communication Engineering at the Manipal Institute of Technology, Manipal.

Optical fibre communication is fast extending the boundaries of research laboratories and attaining the threshold of real-life applicability. The book attempts to provide a thorough understanding of the fundamentals of optical fibre communication.

Organized into nine chapters, this book begins with a discussion of planar dielectric waveguide and proceeds to discuss optical fibre and the propagation of light through it. It also covers Erbium Doped Fibre Amplifier (EDFA), semiconductor optical sources and detectors, fibre optic communication systems, and fibre optic measurements.

In the **Second Edition**, lucid presentation of the text has been maintained without compromising on the comprehension of the subject. Two new chapters on “advanced modulation formats for fibre optic communication systems” and “surface plasmon polaritons and photonic crystals” have been included which discuss topics such as fibre optic coupler, coherent optical communication, BER performance of coherent optical communication systems, differential phase modulation schemes with direct detection, surface plasmon polariton and photonic crystal. Besides, a number of chapters have been significantly revised.

This book is primarily intended as a text for undergraduate students of Electrical Engineering, Electronics and Communication Engineering, and Telecommunication Engineering. The book would also prove to be of immense benefit to postgraduate students of Physics and those preparing for AMIE and AMIETE exams.

#### KEY FEATURES

- Lucid discussion of concepts, ensuring easy comprehensibility of even advanced topics to undergraduate students.
- Numerical problems forming an integral part of the book, making it application-oriented.
- Solutions to chapter-end numerical problems provided at the end of the book.

**CONTENTS:** Preface. Acknowledgements. Dielectric Waveguides—Part 1: Planar Waveguides. Dielectric Waveguides—Part 2: Optical Fibres. Attenuation and Distortion in Optical Fibres. Erbium Doped Fibre Amplifiers. Optical Sources and Detectors. Fibre Optic Communication Systems. Advanced Modulation Formats for Fibre Optic Communication Systems. Fibre Optic Measurements. Surface Plasmon Polaritons and Photonic Crystals. Solutions to Problems. Index.

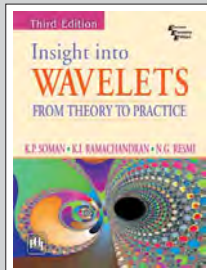
Latest Print 2014 / 264 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4905-6 / ₹ 295.00



## ENGINEERING

### Electrical/Electronics (COMMUNICATION/MICROWAVE)

#### Insight into Wavelets: From Theory to Practice, 3rd ed. (with CD-ROM)



**K.P. SOMAN**, Head, Centre for Excellence in Computational Engineering and Networking, Amrita Vishwa Vidyapeetham, Coimbatore.

**K.I. RAMACHANDRAN**, Professor, Centre for Excellence in Computational Engineering and Networking, Amrita Vishwa Vidyapeetham, Coimbatore.

**N.G. RESMI**, Research Associate in Centre for Excellence in Computational Engineering and Networking, Amrita University, Coimbatore.

This book in its third edition additionally explores how the ubiquitous electronic spreadsheet can be utilized for wavelet based signal and image processing. Many of the intriguing properties of wavelet and scaling functions can be easily observed in the spreadsheets.

#### NEW TO THIS EDITION

- Inclusion of a separate and elaborate chapter on Multiwavelet theory.
- Theory of parametric wavelet filters design appended in respective chapters.
- Parametric and non-parametric biorthogonal wavelet design explained in more detail.
- Chapter on M-band wavelet included with simplified design procedures.

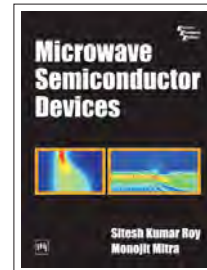
Intended to cater to the postgraduate students of computer science, electrical/electronic and communication engineering, the textbook will also meet the needs of undergraduate and postgraduate students of mathematics and physics.

**CONTENTS:** Preface. Preface to the First Edition. Acknowledgements. The Age of Wavelets. Fourier Series and Geometry. Continuous Wavelet and Short Time Fourier Transform. Discrete Wavelet Transform. Designing Orthogonal Wavelet Systems: A Direct Approach. Discrete Wavelet Transform and Relation to Filter Banks. Computing and Plotting Scaling and Wavelet Functions. Biorthogonal Wavelets. Designing Wavelets: Frequency Domain Approach. Groebner Basis for Wavelet Design. Wavelet Packet Analysis. M-Band Wavelets. Introduction to Multiwavelets. Lifting Scheme. Image Compression. Denoising. Beyond Wavelets: The Ridgelets and Curvelets. Spline Wavelets: Introduction and Applications to Computer Graphics. Appendix. Index.



Latest Print 2013 / 464 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4053-4 / ₹ 425.00

#### Microwave Semiconductor Devices



**SITESH KUMAR ROY**, Chief Investigator of DRDO projects with Institute of Radio Physics and Electronics (IRPE), Calcutta.  
**MONOJIT MITRA**, is a senior faculty in the Department of Electronics and Telecommunication Engineering in Bengal Engineering College (Deemed University), Howrah.

The main objective of this comprehensive text is to introduce the students the physics and the operational principles as well as the characteristics, and applications of the microwave semiconductor devices.

The book also deals with higher frequency microwaves called millimeter waves, which are finding wide applications in ground and satellite communication, radars and missile guidance. Millimeter wave system development is one of the most advanced technologies in radio science, especially in view of the ever increasing demand of communication and saturation of microwave frequency range with increasing number of channels.

The book discusses in greater detail about the semiconductor devices such as IMPATT diodes, Gunn diodes, HEMT diodes and FET diodes. It emphasizes on various two and three terminal devices in the microwave and millimeter wave field based on silicon and Groups III-V compound semiconductors.

The book is intended to serve as a textbook for undergraduate electronics and electrical engineering students and postgraduate students of physics. It would also be a valuable reference book for professional engineers and physicists.

**CONTENTS:** Preface. Microwave and Millimeter Wave Devices. Physics of Semiconductor Devices. Microwave IMPATT Devices. TRAPATT Diodes. BARITT Diodes. Transfer Electron Devices (Gunn Diode). Tunnel Diode. Schottky Barrier Diodes. Microwave Bipolar Transistors. Metal Semiconductor Field Effect Transistors (MESFETs). High Electron Mobility Transistor (Modulation Doped Field Effect Transistor). Appendix. Index.

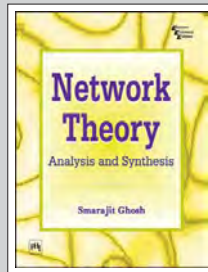
Latest Print 2009 / 204 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2418-3 / ₹ 195.00



## ENGINEERING

Electrical/Electronics (COMMUNICATION/MICROWAVE)

### Network Theory: Analysis and Synthesis



**SMARJIT GHOSH**, *Professor, Electrical and Instrumentation Engineering, Thapar University Patiala, Punjab.*

This book offers an excellent and practically oriented introduction to the basic concepts of modern circuit theory. It builds a thorough and rigorous understanding of the analysis techniques of electric networks, and also explains the essential procedures involved in the synthesis of passive networks. Written specifically to meet the needs of undergraduate students of electrical and electronics engineering, electronics and communication engineering, instrumentation and control engineering, and computer science and engineering, the book provides modularized coverage of the full spectrum of network theory suitable for a one-semester course.

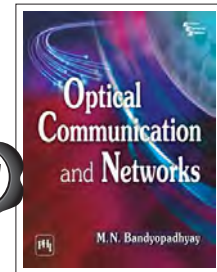
A balanced emphasis on conceptual understanding and problem-solving helps students master the basic principles and properties that govern circuit behaviour. A large number of solved examples show students the step-by-step processes for applying the techniques presented in the text. A variety of exercises with answers at the chapter ends allow students to practice the solution methods.

Besides students pursuing courses in engineering, the book is also suitable for self-study by those preparing for AMIE and competitive examinations. An objective-type question bank at the end of book is designed to see how well the students have mastered the material presented in the text.

**CONTENTS:** Preface. Acknowledgements. Fundamentals of Circuits. Kirchhoff's Laws. DC Network Theorems. DC Transients. Single-Phase AC Circuits. Resonance. Three-Phase Systems. Fourier Series and Fourier Transform. Laplace Transform. Application of Laplace Transform. Analysis of Special Signal Waveforms. Application of Kirchhoff's Laws and Network Theorems to AC Circuits. Coupled Circuits. Two-Port Networks. Properties of Network Functions. Network Graph Theory. Analogous Systems. State Variable Approach. Transmission Lines. Passive Filters. Attenuators. Equalizers. Active Filters. Synthesis of Passive Networks. *Appendix A Phasors in AC Circuits. Appendix B PSpice Commands. Objective-type Questions.* Bibliography. Index.

**Latest Print 2013 / 744 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-2638-5 / ₹ 425.00**

### Optical Communication and Networks



**M.N. BANDYOPADHYAY**, *Director, National Institute of Technology Calicut, Kerala.*

This comprehensive and student friendly text provides a thorough understanding of the fundamental concepts of semiconductor and optical fiber, optical fiber cables, mathematical analysis of fiber communication, study of optical sources, noise in photodetectors, transmitters and receivers, tunable filters, optodigital transmission system and optical fibers in telephone network. The main objective is to provide students with a clear understanding of the principles of optical communication.

The book contains a number of solved examples that illustrate the application of theory to reinforce the concepts. Besides, a number of objective type questions are provided in the text.

The book is intended for use as a textbook for the undergraduate students of electrical, electronics and telecommunication engineering.

**CONTENTS:** Preface. Optical Communication. Semiconductors and Optical Fiber. Cables. Optical Fiber Loss, Signal Distortion and Spectral Dispersion. Mathematical Analysis of Optical Fiber Operation. Study of Optical Sources. Study of Optical Detectors. Basic Principle of Optical Communication System. Transmitters and Receivers. Optical Network. Design of Optical Communication System. Opto Digital Transmission System. Voice Transmission Through Fiber Optic Communication. Video Transmission Over Fiber Optic Links. Optical Networks. Appendix. Objective Type Questions. Answer to Objective Type Questions. Index.

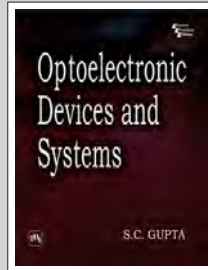
**Latest Print 2014 / 412 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-4854-7 / ₹ 395.00**



## ENGINEERING

Electrical/Electronics (COMMUNICATION/MICROWAVE)

### Optoelectronic Devices and Systems



**S.C. GUPTA** is Director, Maharaja Agarsain Institute of Technology, U.P. Technical University, Lucknow.

This textbook offers a completely up-to-date and indepth introduction to the principles and applications of optoelectronic devices and systems. The text gives a detailed description of optical fibre waveguides, optical fibre cables and their characteristics, manufacturing process and drawing of optical fibres. In addition, it deals with photon sources, photon detectors, fibre optics as a medium and LAN and WAN systems, short and long haul optical fibre communication systems, electrooptic modulators and their characteristics.

#### KEY FEATURES

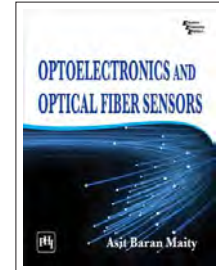
- Provides comprehensive explanation of optical fibre communication with illustrations.
- Gives extensive theory and experimental and holo-graphic applications.
- Discusses the applications of lasers in industry, military and medical as well as fibre optics applications.
- Describes optical computing, optical gates and their applications with illustrations.
- Solved numericals are given at the end of book for better understanding of topics.

Intended primarily for undergraduate students in electrical engineering and electronics and telecommunication engineering, the book should also prove extremely useful for postgraduate students of physics.

**CONTENTS:** Preface. Waveguides and Optical Fibre. Photon Sources and Detectors. Electro-Optical Devices. Fourier Optics and Holography. Optical Communication Systems. Fibre Optic Sensors. Optical Computing. Laser Applications in Industry, Medical and Military. Solved Examples. Appendices. Index.

**Latest Print 2011 / 656 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-2694-1 / ₹ 350.00**

### Optoelectronics and Optical Fiber Sensors



**ASIT BARAN MAITY**, Professor and Dean in School of Applied Sciences, Haldia Institute of Technology, West Bengal.

*Optoelectronics and Optical Fiber Sensors* is a comprehensive and well-organised book that covers wide aspects of optoelectronic processes, optoelectronic devices, mostly used optical fibers and optical fiber sensor systems including maximum technical discussions.

The text highlights the details of design, material selection and working processes as well as the limitations of various optoelectronic devices and fiber-optic sensor systems. Throughout the book, the attempt has been made to cover every important point related to this field from the fundamental concepts to the recent advancements as well as the future scope of the technical development in this exciting field.

Primarily designed for a course of optoelectronics/optoelectronics and fiber optics/optical fiber sensor at both undergraduate and postgraduate levels in electrical and electronics engineering, electronics and communication engineering and applied physics, it would also be appreciated by practising engineers and scientists who want to update the information related to the latest developments in this field.

#### KEY FEATURES

- Provides an enormous information regarding the optical interactions, processes, devices and various other related topics to enlarge the scope of the book.
- Includes an in-depth presentation of important derivations to enhance the level of understanding.
- Incorporates a considerable number of worked-out numericals to reinforce the understanding of the concepts.
- Includes many pedagogical features such as chapterwise *summary*, *exercises* including probable problems and question bank and relevant *references* to provide a sound knowledge of various processes and systems.

**CONTENTS:** Preface. Acknowledgements. Prospects of Optics, Optoelectronics and Fiber-Optic Sensors. Elemental Electronic Properties of Optoelectronic Materials and Device Growth Processes. Optical Process in Semiconductors and Display Devices. Light Source-I: Light Emitting Diodes. Light Source-II: Lasers. Photodetectors. Optical Fiber. Optical Fiber Sensor-I: General Applications. Optical Fiber Sensor-II: Special Applications. Appendix I: Physical Constants and Conversion Factors. Appendix II: Physical Parameters of Some Selective Semiconductors of 300 K. Index.

**Latest Print 2013 / 280 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-4781-6 / ₹ 250.00**

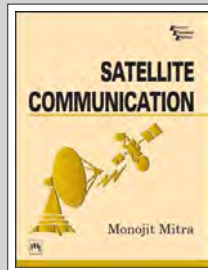


## ENGINEERING

Electrical/Electronics (COMMUNICATION/MICROWAVE)

### Satellite Communication

**MONOJIT MITRA**, *Assistant Professor, Department of Electronics and Telecommunication Engineering at Bengal Engineering and Science University, Shibpur.*



This compact text provides a thorough, readable treatment of the principles of satellite communication and its various technologies and components. It presents a clear analysis of subsystems of satellites, orbital mechanisms, launching mechanisms, earth and space systems employed in satellite links, and analog and digital communication through satellites. Besides, it explains the different methods used to access the various services provided by a satellite.


The text avoids complicated mathematical derivations, but the results of these derivations and their references are used throughout the book when required for understanding the technical concepts.

Primarily intended as a textbook for undergraduate students of electronics and communication engineering, telecommunication engineering, and information technology, this easy-to-understand book will also be useful as a reference for professional engineers.

#### KEY FEATURES

- Provides a cogent study of the effects of eclipse, gravitational forces of sun and moon, and earth's oblateness on the orbit of satellites.
- Explains the effect of noise on the quality of signal over satellite communication links.
- Describes several satellite systems used for study of soil, ice mapping, forest management, and disaster management.
- Discusses satellite system development in the Indian context and appraises readers of India's participation in international communication satellite systems to share and exchange data.

**CONTENTS:** Preface. Overview of Satellite Communication. Satellite Orbits and Inclination. Spacecraft and subsystem. Satellite Link Design. Analog Satellite Communication. Digital Satellite Communication. Multiple Access Techniques. Demand Assigned Multiple Access (DAMA). Encoding and Forwarding Error Correction for Digital Satellite Links. Earth Station Technology. Special Purpose Communication Satellites. Indian Activities in Satellite Communication. Index.

 **Latest Print 2014 / 180 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-2786-3 / ₹ 195.00**

### Satellite Communication: Concepts and Applications, 2nd ed.



**K.N. RAJA RAO**, *Professor, Department of telecommunication engineering and former Principal, R.V. College of Engineering, Bengaluru. He is also the Advisor at R.V. College of Engineering.*

This new edition, an up-to-date and comprehensive title on the rapidly expanding field of satellite communication, is aimed at giving important aspects of space and satellite communication. It starts from fundamental concepts and helps reader to design satellite links. The book provides a smooth flow from satellite launch to various applications of satellite. It contains satellite systems, important parameter calculations and design concepts. The emphasis is on geostationary satellites. The text is organized in such a manner that the reader starts with orbiting parameters and ends at designing a complete multiple access links.

With all of the latest information incorporated and several key pedagogical attributes included, this textbook is an invaluable learning tool for the engineering students of electronics and communication.

#### NEW TO THIS EDITION

- Important design equations have been listed separately.
- Three new chapters—Reliability requirements in satellites, Remote sensing satellites and Error control coding—have been included.
- New Sections are added in Chapters 1, 2 and 3.
- A brief discussion on digitized video transmission is included in Chapter 4.

**CONTENTS:** Preface to the First Edition. Acknowledgements. Nomenclature. An Overview of Space and Satellite. Orbit, Launch and Control. Choice of Carrier. Link Concepts. Satellite Access. Satellite Sub-systems. Satellites in Mobile Communication. Reliability Requirements in Satellites. Remote Sensing Satellites. Error Control Coding. Appendices—1: Important Design Equations. 2: Details of Some of the Satellites. 3: Position Calculations in GPS. Bibliography. Index.

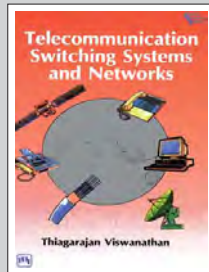
**Latest Print 2013 / 412 pp. / 16.0 × 24.1 cm**  
**ISBN-978-81-203-4725-0 / ₹ 295.00**



## ENGINEERING

Electrical/Electronics (COMMUNICATION/MICROWAVE)

### Telecommunication Switching Systems and Networks



**T. VISWANATHAN**, Director, Indian National Scientific Documentation Centre, New Delhi. Formerly, Professor, Department of Electrical Communication Engineering and Supercomputer Education and Research Centre, Indian Institute of Science, Bangalore.

This comprehensive book is designed for the final-year undergraduate and the first-year graduate students in electronics and communication engineering and fulfils the need for a suitable textbook in the area of telecommunication switching systems and networks. It covers topics of current interest such as fibre optic communication systems and networks, time division switching systems, data networks, ISDN and voice data integration schemes.

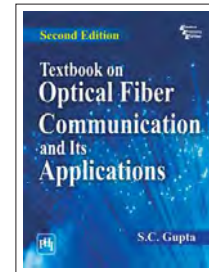
A distinguishing feature of the book is the thorough treatment of the most important telecommunication networks, viz. the public switched telephone network (PSTN), the public data network (PDN), and the integrated services digital network (ISDN).

Worked-out examples, and exercises would be of considerable assistance to the reader in understanding all aspects of telecommunication engineering.

**CONTENTS:** Foreword. Preface. Acknowledgements. Introduction. Strowger Switching Systems. Crossbar Switching Electronic Space Division Switching. Speech Digitisation and Transmission. Time Division Switching. Optical Fibre Systems. Traffic Engineering. Telephone Networks. Data Networks. Integrated Services Digital Network. Epilogue. Answers to Selected Exercises. Index.

 Latest Print 2014 / 604 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-0713-1 / ₹ 395.00

### Textbook on Optical Fiber Communication and Its Applications, 2nd ed.



**S.C. GUPTA**, Director, Northern India Engineering College, Guru Govind Singh Indraprastha University, Delhi.

The Second Edition contains two additional chapters—one on optical fiber sensors and the other on optical fiber networks. These additions together with the material of the first edition provide a comprehensive treatment of optical fiber communication systems and their applications. The material is well presented and is designed for undergraduate students pursuing courses in electrical engineering, and electronics and telecommunication engineering.

The book offers a completely up-to-date, accessible, and in-depth introduction to the principles and applications of optical fiber communications. It describes the recent developments in optical fiber communication materials, devices, components, and systems.

The coverage includes key concepts such as properties of light, semiconductor materials, photon sources, optical receivers, LED and laser transmitters, optical homodyne and heterodyne detection systems, polarization penalty, connectorization and losses in optical fiber, photon-photon multiplexing using WDM and integrated optics, built-up of long haul OFC link at 8 Mbps and 2.5 Gbps, optical fiber applications in LAN/WAN and CCTV, underneath sea communication and long haul optical fiber communication.

#### KEY FEATURES

- Includes pyroelectric detectors and their applications.
- Provides detailed descriptions of short haul and long haul optical fiber links.
- Gives detailed treatment of semiconductor lasers, solid state and fiber lasers for optical communication.
- More rigorous treatment of theory by solved numericals for better understanding of topics.
- Discusses new topics, namely photon-photon multiplexing, and all optical networks.

**CONTENTS:** Preface. Introduction to Optical Fibers. Optical Fibers and Fiber Cables. Electroluminescent Sources. Optical Fiber Transmitter. Optical Detectors. Optical Receiver Systems. Optical Fiber Connections and Optical Amplification. Telecommunication Application. Applications of Optical Fiber Sensors and Systems. Network Applications of Optical Fibers. Index.

Latest Print 2013 / 532 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4580-5 / ₹ 395.00

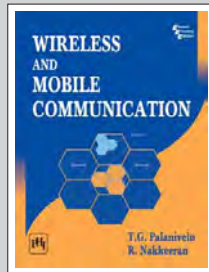


## ENGINEERING

Electrical/Electronics (COMMUNICATION/MICROWAVE)

### Wireless and Mobile Communication

**T.G. PALANIVELU**, *Principal, Pondicherry Engineering College.*  
**R. NAKKEERAN**, *Assistant Professor, Department of Electronics and Communication Engineering, Pondicherry Engineering College.*



This text provides comprehensive coverage of the fundamental aspects of wireless technology and brings into focus the recent developments in the field. It introduces the students to the various mobile communication standards, artificial intelligence techniques for mobility management, and the methods adopted for frequency management.

The book explains the cordless mobile systems and mobile computing and elaborates the satellite techniques essential for global mobile communication and co-channel interference to manage frequency reuse hazards. It deals with important design parameters of mobile communication system and discusses the various security measures adopted to prevent the irregularities in wireless networking. Wideband code division multi-access (WCDMA), Bluetooth technology, and the intelligent mobile communication system that provides better service quality are also described. Finally, the book discusses the fourth generation mobile communication system to provide user-controlled services, internetworking and reconfigurable technology.

The book includes a large number of solved problems to give a thorough grounding in the concepts. It also provides chapter-end exercises to test students' understanding of the subject.

The text is designed for undergraduate students of electrical and electronics engineering, electronics and communication engineering, computer science and engineering, and information technology (IT).

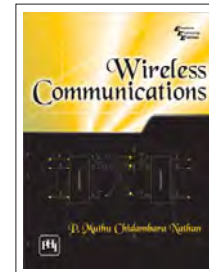
**CONTENTS:** Preface. Introduction. Introduction to Telephone Systems. Mobile Communication. Introduction to Cellular Mobile Communication. Mobile Communication Standards. Mobility Management. Frequency Management. Cordless Mobile Communication Systems. Mobile Computing. Satellites in Mobile Communication. Global Mobile Communication. Interferences in Cellular Mobile Communication. Important Parameters of Mobile Communication. Mobile Internet. Wireless Network Security. Wireless Local Loop Architecture. Wireless Application Protocol. WCDMA Technology and Fibre Optic Microcellular Mobile Communication. Ad hoc and Bluetooth Technology. Intelligent Mobile Communication System. Fourth Generation Mobile Communication Systems. Solved Problems. Appendices. Index.



Latest Print 2013 / 288 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3607-0 / ₹ 250.00

### Wireless Communications

**P. MUTHU CHIDAMBARA NATHAN**, *Associate Professor with Department of Electronics and Communication Engineering, National Institute of Technology, Tiruchirappalli.*



Designed as a textbook for the undergraduate students of electronics and communication engineering, electronics and electrical engineering, computer science and engineering, and information technology, this compact and well organized text presents many recent topics in the fastest growing field of communication.

Beginning with an introduction to modern wireless communication systems, this text covers the basic concepts of cellular and capacity improvement in cellular systems, propagation mechanisms in wireless communication, fading channels, diversity techniques and wireless standards such as GSM, GPRS and UMTS. It concludes with a description on wireless LAN concepts and Bluetooth technology. This book also presents various important topics such as CDMA, MIMO, OFDM, smart antennas and MC-CDMA techniques that have emerged recently.

#### KEY FEATURES

- Provides worked out practical problems in cellular capacity improvement and wireless propagation.
- Emphasizes the purpose of diversity and implementation issues.
- Analyzes thoroughly the diversity combining techniques with probability density functions.
- Gives step-by-step treatment on the evolution of wireless communications till 4G.
- Explains PAPR reduction in MC-CDMA.

Besides undergraduate students, this book will also be useful to the postgraduate students for the courses in wireless communication/mobile communication, researchers and practicing engineers in the field of wireless communication.

**CONTENTS:** Preface. Abbreviations. Wireless Communication. Cellular Concept. Cellular Capacity and Improvement Techniques. Wireless Propagation Mechanisms. Wireless Channel and Diversity. Combining Schemes and the Rayleigh Channel. Joint Probability Density Function of Two Correlated and Unbalanced Rayleigh Signals. Two-branch Selection Diversity in a Rayleigh Channel. Two-branch Maximal Ratio Combining in a Rayleigh Channel. Introduction to 4G Wireless Technologies and Smart Antennas. Introduction to MIMO Systems. Code Division Multiple Access. Orthogonal Frequency Division Multiplexing. Multicarrier Code Division Multiple Access (MC-CDMA). PAPR Reduction Techniques in MC-CDMA. Wireless Standards. Wireless LAN and Bluetooth. Appendix: Erlang-B Table. References. Index.

Latest Print 2013 / 236 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-3514-1 / ₹ 225.00



## ENGINEERING

Electrical/Electronics (CONTROL THEORY)

### Advanced Control Systems



**B.N. SARKAR**, Professor in the Department of Electrical and Electronics Engineering at Dayananda Sagar College of Engineering, Bangalore.

Designed as a textbook for undergraduate students pursuing courses in Electrical Engineering, Electrical and Electronics Engineering, Instrumentation and Control Engineering, and Electronics and Communication Engineering, this book explains the fundamental concepts and design principles of advanced control systems in an understandable manner.

The book deals with the various types of state space modelling, characteristic equations, eigenvalues and eigenvectors including the design of the linear systems applying the pole placement technique. It provides step-by-step solutions to state equations and discusses the stability analysis and design of nonlinear control systems applying the phase plane technique, Routh's criteria, Bode plot, Nyquist plot, Lyapunov's and function methods. Furthermore, it also introduces the sampled-data control systems explaining the  $z$ -transforms and inverse  $z$ -transforms.

The text is supported with a large number of illustrative examples and review questions to reinforce the student's understanding of the concepts.

**CONTENTS:** Preface. Advanced Controllers. State Space Analysis. Characteristic Equations, Eigenvalues and Eigenvectors. Solution of State Equations. Pole Placement Technique. Nonlinear Systems. Phase Plane Analysis. Lyapunov's Stability Analysis. Describing Function Method. Introduction to Digital Control Systems. Index.

Latest Print 2013 / 376 pp. / 17.8 x 23.5 cm



ISBN-978-81-203-4710-6 / ₹ 350.00

### Computer-Based Industrial Control, 2nd ed.



**KRISHNA KANT**, Former Senior Director in the Department of Information Technology, Ministry of Communications and Information Technology, Government of India.

This book, now in its **second edition**, presents in a comprehensive manner the fundamentals of computer-based control of industrial processes. Intended primarily for undergraduate and postgraduate students of instrumentation/electronics engineering, the book will also be immensely useful for professionals and researchers in these fields.

The book begins with a thorough introduction to automation—its history, utility and the current scenario. It then moves on to discuss in detail the techniques, components, subsystems and system architectures relevant to process control. The control techniques covered include classical controls as well as newer controls such as model-based adaptive control, self-tuning control, expert systems and fuzzy logic control. The components consist of sensors and actuators of various types. The subsystems covered are SCADA systems, remote terminal units for telemetry and telecontrol, programmable controllers, distributed digital controllers and personal computers. Also included are real-time operating systems and real-time programming languages. The major architectures discussed are distributed digital control, distributed SCADA system and multi-microprocessor architectures. The book thoroughly covers the various technological developments in this field. It also covers, through a number of case studies, the applications of computer-based control in major industries.

The second edition contains substantially revised and updated content on a large number of topics covered in the first edition.

**CONTENTS:** Foreword. Preface. Preface to First Edition. Acknowledgements. Introduction. Fundamentals of Automatic Process Control. Transducers: Present and Future. Building Blocks of Automation System. Final Control Element. Display Systems. Direct Digital Control: Structure and Software. Distributed Digital Control. Real-time Programming. Personal Computer in Real-time Environment. Programmable Controllers. Modeling and Simulation for Plant Automation. Industrial Control Applications. Intelligent Controllers. Bibliography. Index.

Latest Print 2013 / 616 pp. / 17.8 x 23.5 cm

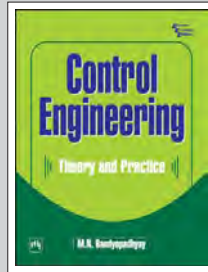
ISBN-978-81-203-3988-0 / ₹ 395.00



## ENGINEERING

### Electrical/Electronics (CONTROL THEORY)

#### Control Engineering: Theory and Practice



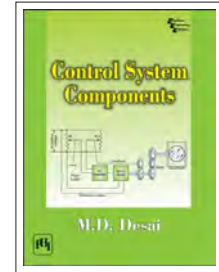
**M.N. BANDYOPADHYAY**, *Director of National Institute of Technology, Kurukshetra.*

This textbook offers a comprehensive analysis of the concepts of classical and modern control engineering for electrical and electronics engineering students. It is written in a manner that makes control theory exciting and accessible to students. It is well written, easy to follow and contains many practical applications, typical solved problems and objective-type questions so that the students can get a solid grounding in the subject matter.

**CONTENTS:** Preface. Introduction. Review of Some Mathematical Tools. Transient and Steady State Behaviour of Systems. State Variable Analysis. Stability of Linear Systems. Study of the Locus of the Root of Characteristic Equation. Analysis of Frequency Response. Stability in Frequency Response Systems. Compensator. Nonlinear Control Systems. Digital Control Systems. Control System Devices. Optimal Control Theory. Introduction to Neural Fuzzy Systems and Adaptive Learning Systems. Miscellaneous Solved Problems. Miscellaneous Exercises. Miscellaneous Objective-type Questions with Answers. Miscellaneous Objective-type Exercises. Miscellaneous Questions and Answers (Subjective Type). Appendix. Index.

**Latest Print 2014 / 612 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-1954-7 / ₹ 395.00**

#### Control System Components



**M.D. DESAI**, *Professor in Instrumentation and Control Engineering, Institute of Technology, Nirma University, Ahmedabad.*

This book is specially designed for undergraduate and postgraduate students in electrical engineering for a course in control system components.

The subject of control system components is interdisciplinary, covering electrical, mechanical, electronic, hydraulic and pneumatic components. This book provides student-friendly coverage of numerous control system components such as cams, gears, gyroscopes, potentiometers, synchros dc and ac servomotors, stepper motors, tachometers, rotating amplifiers, magnetic amplifiers, servo amplifiers, modulators and demodulators, relays, hydraulic system components, and pneumatic control valves etc. The clear writing style of the book, enhanced by illustrative figures, makes it an ideal text for gaining an in-depth understanding of the subject of control system components.

#### KEY FEATURES

- Concise and clear presentation of concepts
- Descriptions of different concepts and processes are illustrated with more than 350 neatly drawn figures
- Chapter-end questions are designed to probe a student's grasp of the subject matter

**CONTENTS:** Preface. Control System Components. CAMs. Gears. Gyroscope. Potentiometers. Synchro. Servomotors. Stepper Motors. Tachometers. Rotating Amplifiers. Magnetic Amplifiers. Servo Amplifiers. Modulators and Demodulators. Relays. Hydraulic Systems. Hydraulic valves. Pneumatic Systems. Pneumatic Control Valves. Valve Characteristics. Index.

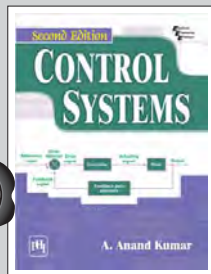
**Latest Print 2013 / 456 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-3605-6 / ₹ 350.00**



## ENGINEERING

### Electrical/Electronics (CONTROL THEORY)

#### Control Systems, 2nd ed.



**A. ANAND KUMAR**, Principal, K.L. University College of Engineering, K.L. University, Vijayawada, Andhra Pradesh.

This comprehensive text on control systems is designed for undergraduate students pursuing courses in electronics and communication engineering, electrical and electronics engineering, telecommunication engineering, electronics and instrumentation engineering, mechanical engineering, and biomedical engineering. Appropriate for self-study, the book will also be useful for AMIE and IETE students.

Written in a student-friendly readable manner, the book, now in its Second Edition, explains the basic fundamentals and concepts of control systems in a clearly understandable form. It is a balanced survey of theory aimed to provide the students with an in-depth insight into system behaviour and control of continuous-time control systems. All the solved and unsolved problems in this book are classroom tested, designed to illustrate the topics in a clear and thorough way.

#### NEW TO THIS EDITION

- One new chapter on Digital control systems
- Complete answers with figures
- Root locus plots and Nyquist plots redrawn as per MATLAB output
- MATLAB programs at the end of each chapter
- Glossary at the end of chapters

#### KEY FEATURES

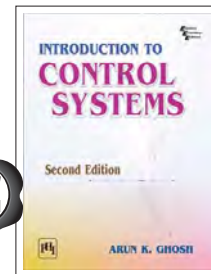
- Includes several fully worked-out examples to help students master the concepts involved.
- Provides short questions with answers at the end of each chapter to help students prepare for exams confidently.
- Offers fill in the blanks and objective type questions with answers at the end of each chapter to quiz students on key learning points.
- Gives chapter-end review questions and problems to assist students in reinforcing their knowledge.

**Contents:** Preface. Symbols, Notations and Abbreviations. Introduction to Control Systems. Mathematical Models of Physical Systems. Block Diagram and Signal Flow Graphs. Time Response Analysis. Routh Stability Criterion. Root Locus Technique. Frequency Response Analysis. Nyquist Plot. Compensation. State-Space Analysis. Digital Control Systems. Glossary. Answers. Index.

Latest Print 2014 / 892 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4939-1 / 495.00



#### Introduction to Control Systems, 2nd ed.



**ARUN K. GHOSH**, Visiting Professor, Sir J.C. Bose School of Engineering, Hooghly.

The Second Edition to this text, which is largely revised and updated version of *Introduction to Linear and Digital Control Systems* by the same author, continues to build on the fundamental concepts covered earlier.

The text discusses the important concepts of control systems, transfer functions and system components. It describes system stability, employing the Hurwitz-Routh stability criterion, root locus technique, Bode plot and polar and Nyquist plots. In addition, this student-friendly book features in-depth coverage of controllers, compensators, state-space modelling, and discrete time systems.

The book is designed for undergraduate courses in control systems for electrical engineering, electronics and instrumentation, electronics and communication, instrumentation and control, and computer science and engineering courses.

#### NEW TO THIS EDITION

- New chapter on Relevant Mathematics.
- Incorporates many more worked-out examples mostly related from the GATE exams on Instrumentation Engineering over the last several years.
- Text refined, wherever felt necessary, to make it more student friendly.

**CONTENTS:** Preface. Abbreviations. Elementary Concepts. Control Systems and Transfer Functions. Block Diagrams and Signal Flow Graphs. Modelling of Systems, System Components and Systems. Feedback Control Characteristics. Time Domain Performance of Control Systems. Basics of Controllers. Stability and Hurwitz-Routh Criteria. Root Locus Technique. Frequency Domain Analysis. Bode Plot. Polar and Nyquist Plots. Compensators. State-Space Modelling. Discrete Time Systems. Appendices—A. Laplace Transform. B. Partial Fraction Expansion for Transfer Functions. C. Matrices. D. Convolution. E. MATLAB Primer. Answers to Selected Review Questions. Index.

Latest Print 2013 / 748 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4820-2 / 595.00





## ENGINEERING

Electrical/Electronics (CONTROL THEORY)

### Modern Control Engineering



**D. ROY CHOUDHURY** is Professor and Head, Computer Engineering Department, Delhi College of Engineering, Delhi.

This book represents an attempt to organize and unify the diverse methods of analysis of feedback control systems and presents the fundamentals explicitly and clearly. The scope of the text is such that it can be used for a two-semester course in control systems at the level of undergraduate students in any of the various branches of engineering (electrical, aeronautical, mechanical, and chemical).

Emphasis is on the development of basic theory. The text is easy to follow and contains many examples to reinforce the understanding of the theory. Several software programs have been developed in MATLAB platform for better understanding of design of control systems. Many varied problems are included at the end of each chapter.

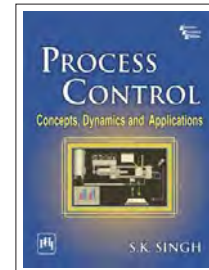
The basic principles and fundamental concepts of feedback control systems, using the conventional frequency domain and time-domain approaches, are presented in a clearly accessible form in the first portion (chapters 1 through 10). The later portion (chapters 11 through 14) provides a thorough understanding of concepts such as state space, controllability, and observability. Students are also acquainted with the techniques available for analysing discrete-data and nonlinear systems.

The hallmark feature of this text is that it helps the reader gain a sound understanding of both modern and classical topics in control engineering.

**CONTENTS:** Preface. Introduction to Control Systems. Mathematical Modeling of Systems. Characteristics of Feedback Control Systems. Transient Response Analysis. Routh Stability and Robust Control. Root-Locus Technique. Process Control System. Frequency Response Analysis. Nyquist Stability. Compensation Techniques. State-Variable Formulation. Analysis and Design of Modern Control Systems. Digital Control Systems. Nonlinear Systems. Index.

Latest Print 2013 / 840 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2196-0 / ₹ 450.00

### Process Control: Concepts, Dynamics and Applications



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

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.

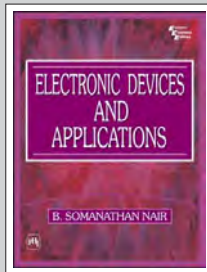
Latest Print 2012 / 748 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3678-0 / ₹ 450.00



## ENGINEERING

### Electrical/Electronics (DEVICES)

#### Electronic Devices and Applications



**B. SOMANATHAN NAIR**, *Principal, Pankaja Kasthuri College of Engineering and Technology, Thiruvananthapuram (Kerala).*

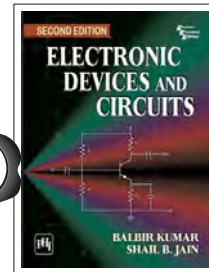
This book is an outgrowth of a set of notes prepared by the author for the first and second year of undergraduate students of various disciplines of engineering and applied sciences, such as electronics, computer science, and information technology.

The text aims at giving clear and simplified explanations on the physical construction, relevant characteristics, principles of operation, and applications of several currently and widely used devices in electronic industries and research fields. As far as possible, mathematics is completely avoided. However, simple mathematical analyses are made in situations as and when they are required.

**CONTENTS:** Preface. Passive Components. Electron Dynamics. Vacuum Electron Devices. Semiconductor Electronics. Semiconductor Diodes. Types of Semiconductor Diodes. Applications of Semiconductor Diodes. Bipolar Junction Transistors. Field-Effect Transistors. Transistors as Amplifiers. Power Semiconductor Devices. Electrooptic Devices. Optoelectronic Devices. Microwave Semiconductor Devices. Appendices. Answers. Index.

**Latest Print 2013 / 360 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-2085-7 / ₹ 325.00**

#### Electronic Devices and Circuits, 2nd ed.



**BALBIR KUMAR**, *has been Additional Director at Bhagwan Parshuram Institute of Technology, Delhi.*

**SHAIL B. JAIN**, *Professor, Department of Electronics and Communication Engineering, Indira Gandhi Institute of Technology, GGSIP University, Delhi.*

Designed as a text for the students of various engineering streams such as electronics/electrical engineering, electronics and communication engineering, computer science and engineering, IT, instrumentation and control and mechanical engineering, this *well-written* text provides an introduction to electronic devices and circuits. It introduces to the readers electronic circuit analysis and design techniques with emphasis on the operation and use of semiconductor devices. It covers principles of operation, the characteristics and applications of fundamental electronic devices such as *p-n* junction diodes, bipolar junction transistors (BJTs), and field effect transistors (FETs), and special purpose diodes and transistors.

What distinguishes this text is that it explains the concepts and applications of the subject in such a way that even an average student will be able to understand working of electronic devices, analyze, design and simulate electronic circuits. This comprehensive book provides:

- A large number of solved examples.
- Summary highlighting the important points in the chapter.
- A number of Review Questions at the end of each chapter.
- A fairly large number of unsolved problems with answers.

**CONTENTS:** Preface. Semiconductor Physics. The *p-n* Junction Diode. Applications of Diodes. Bipolar Junction Transistors (BJTs). BJT Biasing (Q-point) and Stability. BJT Amplifiers. Field-Effect Transistors—Characteristics and Biasing. FET Amplifiers. Multistage Amplifiers. Frequency Response of Amplifiers. Feedback Amplifiers. Oscillators. Power Amplifiers and Voltage Regulators. Special Purpose Devices. Index.

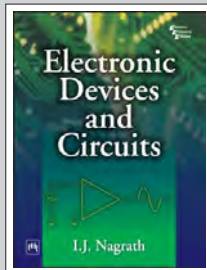
**Latest Print 2013 / 744 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-4844-8 / ₹ 425.00**



## ENGINEERING

### Electrical/Electronics (DEVICES)

#### Electronic Devices and Circuits



**I.J. NAGRATH**, *Adjunct Professor and former Deputy Director, Birla Institute of Technology & Science, Pilani.*

Designed specifically for undergraduate students of Electronics and Electrical Engineering and its related disciplines, this book offers an excellent coverage of all essential topics and provides a solid foundation for analysing electronic circuits. It covers the course named Electronic Devices and Circuits of various universities. The book will also be useful to diploma students, AMIE students, and those pursuing courses in B.Sc. (Electronics) and M.Sc. (Physics).

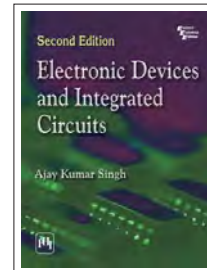
The students are thoroughly introduced to the full spectrum of fundamental topics beginning with the theory of semiconductors and *p-n* junction behaviour. The devices treated include diodes, transistors—BJTs, JFETs and MOSFETs—and thyristors. The circuitry covered comprises small signal (ac), power amplifiers, oscillators, and operational amplifiers including many important applications of those versatile devices. A separate chapter on IC fabrication technology is provided to give an idea of the technologies being used in this area.

There are a variety of solved examples and applications for conceptual understanding. Problems at the end of each chapter are provided to test, reinforce and enhance learning.

**CONTENTS:** Preface. Semiconductors, Diodes and Diode Circuits. Transistors and Other Devices. Small-Signal Models, Amplification and Biasing. Small-Signal Amplifiers—Frequency Response. Large-Signal Amplifiers. Feedback Amplifiers and Oscillators. Operational Amplifiers. 8. Multivibrators and Switching Regulators. Integrated Circuits Fabrication. Circuit Theory. Cathode Ray Oscilloscope (CRO). Appendix: The Ebers-Moll Model of the BJT. References. Answers to Problems. Index.

 **Latest Print 2012 / 564 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-3195-2 / ₹ 325.00**

#### Electronic Devices and Integrated Circuits, 2nd ed.



**AJAY KUMAR SINGH**, *Senior Lecturer, Faculty of Engineering and Technology (FET), Multimedia University (MMU), Malaysia.*

This book, now in its Second Edition, provides a basis for understanding the characteristics, working principle, operation and limitations of semiconductor devices. In this new edition, many sections are re-written to present the concepts related to device physics in more clearer and easy to understand manner.

The primary objective of this textbook is to provide all the relevant topics on the semiconductor materials and semiconductor devices in a single volume. It includes enough mathematical expressions to provide a good foundation for the basic understanding of the semiconductor devices. It covers not only the state-of-the-art devices but also future approaches that go beyond the current technology.

Designed primarily as a text for the postgraduate students of physics and electronics, the book would also be useful for the undergraduate students of electronics and electrical engineering, and electronics and communication engineering.

#### Highlights of the Book:

- Includes topics on the latest technologies
- Covers important points in each chapter
- Provides a number of solved and unsolved problems along with explanation type questions
- Emphasizes on the mathematical derivation

**CONTENTS:** Preface. Atomic Structure and Theory of Solids. Semiconductor Material and Its Band Diagram. Transport Phenomenon in Semiconductor. *p-n* Junction. Metal-semiconductor Contact. Field Effect Transistor (FET). Metal Oxide Semiconductor Field Effect Transistor (MOSFET). CMOS: Scaling and Its Limitations. Bipolar Transistors. Optoelectronic Devices and Power Devices. Integrated Circuits and Fabrication. Appendices—A: Physical Constants. B: Material Parameters for Important Semiconductors, Si and GaAs. C: SPICE Model. Index.

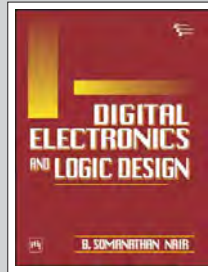
**Latest Print 2013 / 612 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-4471-6 / ₹ 525.00**



## ENGINEERING

Electrical/Electronics (DIGITAL DESIGN)

### Digital Electronics and Logic Design



**B. SOMANATHAN NAIR**, *Principal, Pankaja Kasthuri College of Engineering and Technology, Thiruvananthapuram (Kerala).*

Designed as a textbook for undergraduate students in Electrical Engineering, Electronics, Computer Science, and Information Technology, this up-to-date, well-organized study gives an exhaustive treatment of the basic principles of Digital Electronics and Logic Design. It aims at bridging the gap between these two subjects.

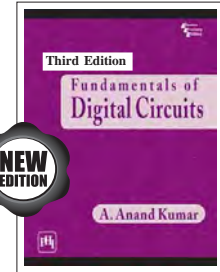
The many years of teaching undergraduate and postgraduate students of engineering that Professor Somanathan Nair has done is reflected in the in-depth analysis and student-friendly approach of this book. Concepts are illustrated with the help of a large number of diagrams so that students can comprehend the subject with ease. Worked-out examples within the text illustrate the concepts discussed, and questions at the end of each chapter drill the students in self-study.

This book, with its in-depth analysis and several new features, should be treasured by the student—for its felicity of style and its all encompassing treatment of the subject.

**CONTENTS:** Preface. The Number Systems. Boolean Algebra and Logic Simplification. Combinational Logic Circuits. Sequential Logic Circuits. Synthesis and Analysis of Synchronous Sequential Circuits. Asynchronous Sequential Logic Circuits. Logic Families. Memories. Digital-to-Analog and Analog-to-Digital Converters. Hazards. Fault Detection. Clock Generators. Fabrication of Integrated Circuits. Manufacturing of Integrated Circuits. Appendices—A: Some Special Definitions. B: Word-Statement Problems. C: Miscellaneous Topics in ICs. D: Liquid-Phase Epitaxi. E: EBCDIC Table. F: BICMOS Logic Circuits. Bibliography. Index.

**Latest Print 2014 / 448 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-1956-1 / ₹ 350.00**

### Fundamentals of Digital Circuits, 3rd ed.



**A. ANAND KUMAR**, *Principal, College of Engineering, K.L. University, Vijayawada, Andhra Pradesh.*

The third edition of this well-received text continues to provide coherent and comprehensive coverage of digital circuits. Now, based on the readers' demand, this new edition incorporates **VHDL programs** at the end of each chapter. It is designed for the undergraduate students pursuing courses in areas of engineering disciplines such as Electrical and Electronics, Electronics and Communication, Electronics and Instrumentation, Telecommunications, Medical Electronics, Computer Science and Engineering, Electronics, and Computers and Information Technology. It is also useful as a text for MCA, M.Sc. (Electronics) and M.Sc. (Computer Science) students. Appropriate for self study, the book is useful even for AMIE and grad IETE students.

Written in a student-friendly style, the book provides an excellent introduction to digital concepts and basic design techniques of digital circuits. It discusses Boolean algebra concepts and their application to digital circuitry, and elaborates on both combinational and sequential circuits. It provides numerous fully worked-out, laboratory tested examples to give students a solid grounding in the related design concepts. It includes a number of short questions with answers, review questions, fill in the blanks with answers, multiple choice questions with answers and exercise problems at the end of each chapter.

As the book requires only an elementary knowledge of electronics to understand most of the topics, it can also serve as a textbook for the students of polytechnics, B.Sc. (Electronics) and B.Sc. (Computer Science).

**CONTENTS:** Preface. Symbols, Notations. Abbreviations. Introduction. Number Systems. Binary Codes. Logic Gates. Boolean Algebra. Minimization of Switching Functions. Combinational Logic Design. Programmable Logic Devices. Threshold Logic. Flip-Flops. Shift Registers. Counters. Sequential Circuits-I. Sequential Circuits-II. Algorithmic State Machines. Logic Families. Analog-to-Digital and Digital-to-Analog Converters. Memories. Timing Circuits and Display Devices. Appendix. Glossary. Answers. Index.

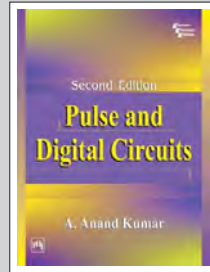
**Latest Print 2014 / 1024 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-5052-6 / ₹ 475.00**



## ENGINEERING

### Electrical/Electronics (DIGITAL DESIGN)

#### Pulse and Digital Circuits, 2nd ed.



**A. ANAND KUMAR**, Principal, K.L. University College of Engineering, K.L. University, Vijayawada, Andhra Pradesh.

The second edition of this well-received text continues to provide a coherent and comprehensive coverage of Pulse and Digital Circuits, suitable as a textbook for use by undergraduate students pursuing courses in Electrical and Electronics Engineering, Electronics and Communication Engineering, Electronics and Instrumentation Engineering, and Telecommunication Engineering. It presents clear explanations of the operation and analysis of semiconductor pulse circuits. Practical pulse circuit design methods are investigated in detail.

The book provides numerous fully worked-out, laboratory-tested examples to give students a solid grounding in the related design concepts. It includes a number of classroom-tested problems to encourage students to apply theory in a logical fashion. Review questions, fill in the blanks, and multiple choice questions offer the students the opportunity to test their understanding of the text material.

This text will be also appropriate for self-study by AMIE and IETE students.

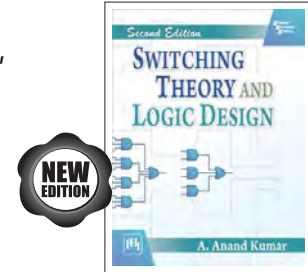
#### NEW TO THIS EDITION

- Includes two new chapters—*Logic Gates* and *Logic Families*—to meet the curriculum requirements.
- Provides short questions with answers at the end of each chapter.
- Presents several new illustrations, examples and exercises.

**CONTENTS:** Preface. Linear Wave Shaping. Nonlinear Wave Shaping. Switching Characteristics of Devices. Multivibrators. Time-Base Generators. Synchronization and Frequency Division. Sampling Gates. Logic Gates. Logic Families. Blocking Oscillators. Glossary. Answers. Index.

 **Latest Print 2014 / 572 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-3356-7 / ` 395.00**

#### Switching Theory and Logic Design, 2nd ed.



**A. ANAND KUMAR**, Principal, K.L. University College of Engineering, K.L. University, Vijayawada, Andhra Pradesh.

This comprehensive text on switching theory and logic design is designed for the undergraduate students of electronics and communication engineering, electrical and electronics engineering, electronics and instrumentation engineering, telecommunication engineering, computer science and engineering, and information technology. It will also be useful to AMIE, IETE and diploma students.

Written in a student-friendly style, this book, now in its Second Edition, provides an in-depth knowledge of switching theory and the design techniques of digital circuits. Striking a balance between theory and practice, it covers topics ranging from number systems, binary codes, logic gates and Boolean algebra to minimization using K-maps and tabular method, design of combinational logic circuits, synchronous and asynchronous sequential circuits, and algorithmic state machines. The book discusses threshold gates and programmable logic devices (PLDs). In addition, it elaborates on flip-flops and shift registers.

Each chapter includes several fully worked-out examples so that the students get a thorough grounding in related design concepts. Short questions with answers, review questions, fill in the blanks, multiple choice questions and problems are provided at the end of each chapter. These help the students test their level of understanding of the subject and prepare for examinations confidently.

#### NEW TO THIS EDITION

- VHDL programs at the end of each chapter
- Complete answers with figures
- Several new problems with answers

**Contents:** Preface. Symbols, Notations and Abbreviations. Introduction. Number Systems and Codes. Boolean Algebra and Switching Functions. Minimization of Switching Functions. Combinational Logic Design. Programmable Logic Devices and Threshold Logic. Sequential Circuits-I. Sequential Circuits-II. Algorithmic State Machines. Appendix. Glossary. Answers. Index.

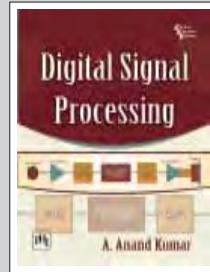
**Latest Print 2014 / 844 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-4938-4 / ` 495.00**



## ENGINEERING

### Electrical/Electronics (DIGITAL SIGNAL PROCESSING)

#### Digital Signal Processing



**A. ANAND KUMAR**, *Principal, K.L. University College of Engineering, K.L. University, Vijayawada, Andhra Pradesh.*

This comprehensive text on digital signal processing is designed for undergraduate students of electronics and communication engineering, telecommunication engineering, electronics and instrumentation engineering, and electrical and electronics engineering. The book will also be useful to AMIE and IETE students.

Written with student-centred, pedagogically driven approach, the text provides a self-contained introduction to the theory of digital signal processing. It covers topics ranging from basic discrete-time signals and systems, realization of discrete-time systems, discrete-time Fourier transform and its use in the analysis of signals, discrete Fourier series to discrete Fourier transform. In addition to this, various design techniques for FIR filters, such as Fourier series method, the window method and the frequency sampling method, architectures for programmable digital signal processors (P-DSPs) and on-chip peripherals are also discussed in detail. All the solved and unsolved problems in this book are designed to illustrate the topics in a clear way.

#### KEY FEATURES

- Numerous worked-out examples in each chapter
- Short questions with answers help students to prepare for examinations
- Objective type questions, review questions and unsolved problems at the end of each chapter to test the level of understanding of the subject.

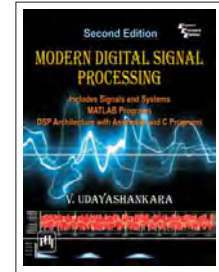
**CONTENTS:** Preface. Discrete-Time Signals and Systems. Discrete Convolution and Correlation. Z-Transforms. System Realization. Discrete-Time Fourier Transform. Discrete Fourier Series (DFS) and Discrete Fourier Transform (DFT). Fast Fourier Transform. Infinite-duration Impulse Response (IIR) Filters. FIR Filters. Multi-rate Digital Signal Processing. Introduction to DSP Processors. Glossary. Answers. Index.

**Latest Print 2013 / 808 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-4620-8 / ₹ 495.00**



*PHI Learning: Publications*

#### Modern Digital Signal Processing includes Signals and Systems MATLAB Programs, DSP Architecture with Assembly and C Programs, 2nd ed.



**V. UDAYASHANKARA**, *Professor in the Department of Instrumentation Technology, Sri Jayachamarajendra College of Engineering (SJCE), Mysore.*

Intended as a text for three courses—Signals and Systems, Digital Signal Processing (DSP), and DSP Architecture—this comprehensive book, now in its Second Edition, continues to provide a thorough understanding of digital signal processing, beginning from the fundamentals to the implementation of algorithms on a digital signal processor.

This Edition includes a new chapter on Continuous Time Signals and Systems, and many Assembly and C programs, which are useful to conduct a laboratory course in Digital Signal Processing. Besides, many existing chapters are modified substantially to widen the coverage of the book.

Primarily designed for undergraduate students of Electronics and Communication Engineering, Electronics and Instrumentation Engineering, Electrical and Electronics Engineering, Instrumentation and Control Engineering, Computer Science and Engineering, and Information Technology, this text will also be useful as a supplementary text for advanced digital signal processing and real time digital signal processing courses of Postgraduate programmes.

**CONTENTS:** Preface. Introduction. Continuous Time Signals and Systems. Discrete Time Signals and Systems. Discrete Time Linear Time-invariant System. Correlation. Fourier Series and Fourier Transform of Continuous Time Signals. Fourier Series and Fourier Transform of Discrete Time Signals. Z-transforms. Realization of Digital System. Discrete Fourier Transform its Properties and its Applications. Fast Fourier Transform. Discrete Cosine Transform. FIR Filters. IIR Filters. Multirate Digital Signal Processing and Filter Bank Fundamentals. Adaptive Filters. Data Formats, Arithmetic Operations and Errors in Digital Signal Processors. Introduction to Digital Signal Processing Devices. Architecture of TMS 320C54XX Digital Signal Processor. Addressing Modes and Instruction Set of TMS 320C54XX DSP. TMS 320VC5416 Assembly Language Programming. Interfacing and Real Time C Programming with TMS 320C54XX. TMS 320C6713 Floating Point Processor Architecture and Real Time C Programming. Index.

**Latest Print 2012 / 824 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-4567-6 / ₹ 495.00**



## ENGINEERING

### Electrical/Electronics (ELECTRIC DRIVES)

#### Design and Testing of Electrical Machines

**M.V. DESHPANDE**, former Professor and Head, Department of Electrical Engineering, L.D. College of Engineering, Ahmedabad and College of Engineering, Pune.



This textbook offers a practical approach to electrical machines, featuring clear-cut explanations of fundamental principles, and attention to industrial practices in design and testing of electrical machines. The basic theory, principle of operation and characteristics of transformers, three-phase induction motors, single-phase induction motors, synchronous machines and dc machines are dealt with in Appendices to provide the background for the design of these machines.

The initial chapters of the book are devoted to basic parameters of design of electrical apparatus, characteristics of magnetic, electric and insulating materials, construction of electrical machines, and basic design requirements of magnetic and electrical circuits of machines. Detailed procedures for designing transformers, three-phase induction motors, single-phase induction motors, synchronous machines and dc machines are explained in a simple and logical way. Several sample designs have been worked out in detail. Methods of carrying out various tests and maintaining test records are discussed in detail.

The use of computers in designing electrical machines has been illustrated. An exclusive chapter on special machines explains the basic theory and applications of stepper motors, rotating phase converters, pole amplitude modulated (PAM) motors, reluctance motors and energy efficient motors.

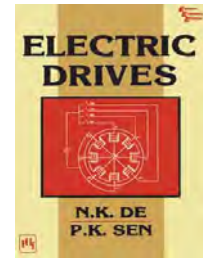
This book is intended for degree and diploma students of electrical engineering and professional examinations of the Institution of Engineers (India). It will be useful for electrical engineers in industry engaged in design, manufacture and testing of electrical machines.

**CONTENTS:** Preface. Acknowledgements. Principles of Design of Electrical Apparatus. Magnetic, Electric and Insulating Materials. Construction of Electrical Machines. Design of Magnetic Circuits: Field System. Design of Electrical Circuits: Armature Windings. Design of Transformers. Testing of Transformers. Design of Three-Phase Induction Motors. Testing of Three-Phase Induction Motors. Design and Testing of Single-Phase Induction Motors. Design of Synchronous Machines. Testing of Synchronous Machines. Design of DC Machines. Testing of DC Machines. Computer Aided Design of Rotating Electrical Machines. Special Machines. Appendices—A: Transformers. B: Three-Phase Induction Motors. C: Single-Phase Induction Motors. D: Synchronous Machines. E: DC Machines. Index.



Latest Print 2013 / 512 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3645-2 / ₹ 425.00

#### Electric Drives



**NISIT K. DE**, Professor, Department of Electrical Engineering, Indian Institute of Technology, Kharagpur.

**PRASANTA K. SEN**, Professor, Department of Electrical Engineering, Regional Engineering College, Durgapur.

This book provides a comprehensive introduction to the fundamental concepts of electric drives and is eminently suited as a textbook for undergraduate, AMIE and courses in electrical engineering. It can also be used most effectively by all those preparing for GATE and UPSC competitive examinations, as well as by practising engineers. The topics, which range from principles and techniques to industrial applications, include characteristic features of drives, methods of braking and speed control, electromagnetic and solid state control of motors, motor ratings, transients in drive systems, and operation of stepper motors.

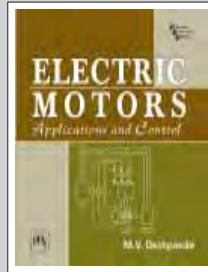
**CONTENTS:** Preface. Introduction. Speed-Torque Characteristics of Motors. Speed Control of DC Motors. Speed Control of AC Motors. Heating and Power Rating of Drive Motors. Transients and Dynamics. Motor Starters and Controllers. Industrial Applications. Bibliography. Answers to Problems. Index.

Latest Print 2014 / 324 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-1492-4 / ₹ 250.00

## ENGINEERING

### Electrical/Electronics (ELECTRIC DRIVES)

#### Electric Motors: Applications and Control



**M.V. DESHPANDE** served as Professor and Head of the Department of Electrical Engineering at L.D. College of Engineering, Ahmedabad and College of Engineering, Pune.

This book provides a practical introduction to the various types of motors used in industrial drives. While selecting suitable motors for industrial applications, a good knowledge of the mechanical and electrical elements involved and a thorough understanding of the load and motor characteristics is essential. The book describes the load requirements of some typical drives, the type of motors used, their characteristics, duty cycles and specifications.

The starting, braking and speed control of dc motors, induction motors and synchronous motors are dealt with. The solid state speed control methods for dc and ac motors are discussed. The criteria for selection of motors for various industrial drives are explained in detail. Finally, electric energy conservation in the use of electric motors and drives is emphasized.

#### KEY FEATURES

- Provides balanced coverage of theory and practical applications of industrial motor drives and their problems.
- Includes numerous worked-out examples to demonstrate and establish the principles and their applications.
- Chapter-end problems include engineering applications of electric motors and electric drives.

This book is suitable for degree and diploma students of electrical engineering as well as for AMIE Part B students for courses in Electric Drives.

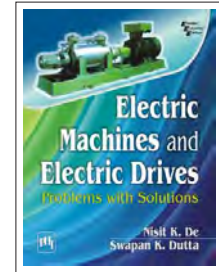
**CONTENTS:** Preface. Load Characteristics. Types of Motors and their Characteristics. Starting and Braking of Motors. Speed Control of Motors. Solid State Motor Control: DC Motor Speed Control. Solid State Motor Control: Induction Motor Speed Control. Selection of Motors for Industrial Drives. Economic Selection of Electric Motors. Index.

Latest Print 2013 / 228 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3643-8 / ` 225.00



### Electrical/Electronics (ELECTRICAL MACHINES)

#### Electric Machines and Electric Drives: Problems with Solutions



**NISIT K. DE**, formerly Professor at IIT Kharagpur (1968–2007), is presently Visiting Professor, Department of Electrical Engineering, Narula Institute of Technology, Kolkata.

**SWAPAN K. DUTTA**, Professor, Department of Electrical Engineering, National Institute of Technology, Durgapur.

This problem-oriented book provides solutions to the common problems in two major areas of Electrical Engineering discipline such as electric machines and electric drives (with power electronics linking them) under a single cover. It serves as a supplement to textbooks on the subject.

The book includes as many as 163 well-graded solved problems, covering topics such as transformer, dc machine, ac machines, induction (motor) and synchronous types, special motors, power electronics and electric drives. The problems have been solved in a clear and step-by-step manner.

Each chapter discusses various formulas and other details such as circuit diagrams and relevant waveforms used to solve the problems.

The book contains 161 supplementary problems with answers for practice. Their complete solutions are also provided at the end of the book. The students can hone their skills and enhance their understanding of the subject matter by solving these supplementary problems.

The book is designed for the undergraduate students of electrical engineering. It will also be useful for those preparing for AMIE and competitive examinations.

**CONTENTS:** Preface. Acknowledgements. Transformer. DC Machine. Induction Motor. Synchronous Machines. Special Machines. Power Electronic Converters. Electric Drives. Solutions to Supplementary Problems. Index.

Latest Print 2013 / 404 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4424-2 / ` 395.00

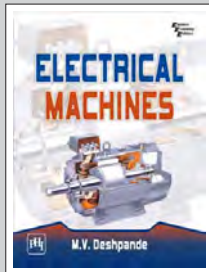




## ENGINEERING

### Electrical/Electronics (ELECTRICAL MACHINES)

#### Electrical Machines



**M.V. DESHPANDE** served as Professor and Head of the Department of Electrical Engineering at L.D. College of Engineering, Ahmedabad and College of Engineering, Pune.

This textbook offers insights into the principles and applications of electrical machines. The text provides a thorough understanding of the fundamentals that are common to all machines. The book elaborates on single-phase and three-phase transformers, DC machines, AC machines as well as commutator motors, and three-phase induction motors, single-phase induction motors, synchronous machines, generators and motors.

This book is intended as a text for students pursuing diploma and undergraduate courses in Electrical Engineering in various universities and engineering institutes. Besides, the book takes care of the requirements of students who are preparing for professional examinations, including those conducted by the Institution of Engineers (India), i.e. AMIE.

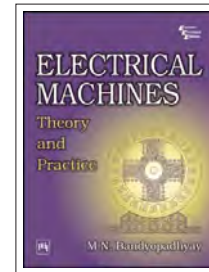
#### KEY FEATURES

- Discusses the step-by-step coverage of the construction of electrical machines.
- Gives the methods of testing of electrical machines.
- Provides the performance calculations of electrical machines.
- Includes numerous worked-out examples.

**CONTENTS:** Preface. Single-phase Transformers: Principle and Construction. Single-phase Transformers: Operation and Testing. Three-phase Transformers: Operation and Testing. Elements of Transformer Design. Laboratory Work (Transformers). Basic Principles of Electrical Machines. Principle and Construction of DC Machines. DC Machines: Operation and Testing. Elements of DC Machine Design. Laboratory Work (DC Machines). Three-phase Induction Motors: Principles and Characteristics. Three-phase Induction Motors: Operation and Testing. Synchronous Machines. Synchronous Machines: Generators. Synchronous Motors. Single-phase Induction Motors. AC Commutator Motors. Laboratory Work (AC Machines). Index.

 Latest Print 2013 / 448 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4026-8 / ₹ 350.00

#### Electrical Machines: Theory and Practice



**M.N. BANDYOPADHYAY**, Director, National Institute of Technology, Kurukshetra, Haryana.

This comprehensive, up-to-date introduction to Electrical Machines is designed to meet the needs of undergraduate electrical engineering students. It presents the essential principles of rotating machines and transformers. The emphasis is on the performance, though the book also introduces the salient features of electrical machine design.

The book provides accessible, student-friendly coverage of dc machines, transformers, three-phase induction motor, single-phase induction motor, fractional horsepower motors, and synchronous machines. The clear writing style of the book enhanced by illustrative figures and simplified explanations of the fundamentals, makes it an ideal text for gaining a thorough understanding of the subject of electrical machines.

#### KEY FEATURES INCLUDE:

- Detailed coverage of the construction of electrical machines.
- Lucid explanations of the principles of operation of electrical machines.
- Methods of testing of electrical machines.
- Performance calculations of electrical machines.
- Wealth of diverse solved examples in each chapter to illustrate the application of theory to practical problems.
- Salient features of design of electrical machines.
- Objective type questions to help students prepare for competitive exams.

**CONTENTS:** Preface. Introduction. DC Machines. Transformers. Three-Phase Induction Motor. Single-Phase Induction Motor. AC Commutator Motor (and Some Special Motors). Synchronous Machines. Appendices—1: Objective Type Questions. 2: Special Features of Transformer Design. 3: Special Features of DC Machine Design. 4: Special Features of Three-Phase Induction Motor Design. 5: Special Features of Design of Synchronous Machine. Index.

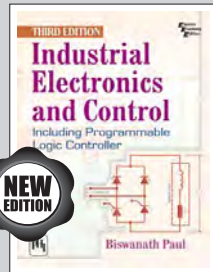
Latest Print 2011 / 516 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2997-3 / ₹ 350.00

## ENGINEERING

### Electrical/Electronics (ELECTRICAL MACHINES)

#### Industrial Electronics and Control including Programmable Logic Controller, 3rd ed.

**BISWANATH PAUL**, Fellow of NMIT (Australia), is with the Department of Electrical Engineering, Acharya Prafulla Chandra Ray Polytechnic, Jadavpur, West Bengal Technical Education, Kolkata.



The third edition of the book on *Industrial Electronics and Control including Programmable Logic Controller* is aimed at providing an explicit explanation of the mode of operation of different electronic power devices in circuits and systems that are in wide use today in modern industry for the control and conversion of electric power. The book strives to fulfil this need for a fundamental treatment that allows students to understand all aspects of circuit functions through its neatly-drawn illustrations and wave diagrams. Several colour diagrams are included to explain difficult circuits and waveforms. This approach will help students in assimilating the operation of power electronics circuits with more clarity.

Same as in previous editions, the book commences with a discussion on rectifiers, differential amplifiers, operational amplifiers, multivibrators, timers and goes on to provide in-depth coverage of power devices and power electronics circuits such as silicon controlled rectifiers (SCRs), inverters, dual converters, choppers, cycloconverters and their applications in the control of ac/dc motors, and heating and welding processes. The book also presents an overview of the modern developments in the field of optoelectronics and fibre optics. Finally, the book ends with a discussion on Programmable Logic Controller (PLC).

The book has an added advantage of multiple-choice questions, true/false statements, review questions and numerical problems at the end of each chapter, designed to reinforce the student's understanding of the concepts and mathematical derivations introduced in the text.

The book is intended as a textbook for polytechnic students pursuing courses in electrical engineering, electronics and communication engineering, and electronics and instrumentation engineering.

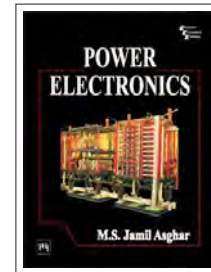
This tailor-made book with its exhaustive explanations of circuit operations and its student-friendly approach should prove to be a boon to the students and teachers alike.

**CONTENTS:** Foreword. Preface. Acknowledgements. Power Supplies. Differential Amplifiers. Operational Amplifiers. Multivibrators, Switching Transistors, and Timers. Thyristors. Inverters, Dual Converters, Choppers, and Cycloconverters. Motor Control. Heating and Welding Control. Optoelectronics and Optical Fibre. AC Power Conditioner. Programmable Logic Controller (PLC). Answers to Multiple Choice Questions, True or False Statements, and Problems. Index



Latest Print 2014 / 640 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4990-2 / 495.00

#### Power Electronics



**JAMIL ASGHAR M. SYED**, Associate Professor, Department of Electrical Engineering, Aligarh Muslim University, Aligarh.

This textbook, designed for undergraduate students of electrical engineering, offers a comprehensive and accessible introduction to state-of-the-art power semiconductor devices and power electronic converters with an emphasis on design, analysis and realization of numerous types of systems.

Each topic is discussed in sufficient depth to expose the fundamental principles, concepts, techniques, methods and circuits, necessary to thoroughly understand power electronic systems.

#### SALIENT FEATURES

- Theory and applications are interlaced with design-oriented solved and unsolved problems.
- Easy-to-understand explanation of the mechanisms of several converter circuits is offered.
- Useful ready-to-use computer programs are introduced in most chapters for the computation of harmonics.
- Standard software packages such as PSPICE, ELECTRONICSWORKBENCH, are discussed to give a real-world exposure to practical design aspects of power electronic circuits.
- New applications of power electronics, like PWM audio amplifiers are introduced.

**CONTENTS:** Preface. Introduction to Power Electronics. Power Semiconductor Devices. Triggering Circuits for Thyristors. Driver Circuits for Gate-commutation Devices. AC Voltage Regulators. Phase-controlled (ac-to-dc) Converters. DC-to-DC Converters. Inverters. Resonant Converters. UPS and SMPS. Device Protection and Magnetic Circuits. Simulation of Power Electronic Converters. Appendices. Bibliography. Answers. Index.

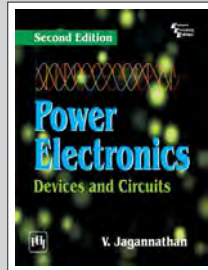
Latest Print 2014 / 504 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2396-4 / 350.00



## ENGINEERING

### Electrical/Electronics (ELECTRICAL MACHINES)

#### Power Electronics: Devices and Circuits, 2nd ed.



**V. JAGANNATHAN**, Professor and Head, Department of Electrical and Electronics Engineering, Coimbatore Institute of Technology, Coimbatore.

This book is a new enlarged edition of *Introduction to Power Electronics*. It is designed for undergraduate students of electrical and electronics engineering and provides an accessible and practical treatment of semiconductor power switching devices and their use in several types of static power converters. The book emphasizes the fundamental principles and offers an easy-to-understand explanation of the operation of practical circuits.

Beginning with the study of the characteristics of power switching devices, the text offers a thorough treatment of ac-ac converters, ac-dc converters, dc-dc converters and inverters, helping students understand how switching converters can be made to generate almost any wave shape and frequency, how power converters are used in conjunction with electric drives, HVDC transmission systems, and so forth.

The topics included in the **second edition** are:

- Ideal and real switches and drive circuits for gate commutation devices
- Single phase series converters and twelve pulse converters
- Switch mode power supply (SMPS) and switch mode dc-dc converters
- Resonant converters and uninterrupted power supply (UPS)

#### KEY FEATURES

- A large number of waveforms, diagrams that provide a vivid picture of circuit actions.
- A variety of solved examples to strengthen concepts.
- Numerous review questions, solved problems and unsolved problems with answers to develop a clear understanding of the basic principles.

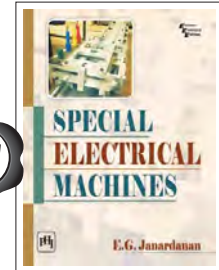
**CONTENTS:** Preface. Introduction. Power Switching Devices and Their Characteristics. AC to DC Converters. AC to AC Converters. DC to DC Converters: Choppers. Inverters. Power Controllers: Their Applications. Microcontroller-Based Control and Protection Circuits. Index.

Latest Print 2011 / 388 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4196-8 / ₹ 275.00



#### Special Electrical Machines



**E.G. JANARDANAN**, Professor, Department of Electrical and Electronics Engineering, N.S.S. College of Engineering, Palakkad, Kerala.

This book covers the complete syllabi prescribed for undergraduate courses in electrical, electronics, mechanical and instrumentation engineering offered by various Indian universities.

The objective of this text is to provide thorough knowledge in the emerging field of special electrical machines. It discusses the stepper motor, switched reluctance motor, permanent magnet dc and ac motors, brushless dc motors, single phase special electric motors, servomotors, linear electric machines and permanent magnet axial flux machines.

#### KEY FEATURES

- Chapter on permanent magnet axial flux machines (not available in other Indian authors' books)
- Numerous worked-out examples
- Based on classroom tested materials
- Simplified mathematical analysis

Besides undergraduate students, the book will also be useful to the postgraduate students specialising in drives and control, power electronics, control systems and mechatronics.

**CONTENTS:** Preface. Organisation of Book. Stepper Motor. Switched Reluctance Motor (SRM). Permanent Magnet DC (PMDC) Motor and Brushless Permanent Magnet DC (BLDC) Motor. Permanent Magnet Synchronous Motor (PMSM). Synchronous Reluctance Motor (SyRM). Single-Phase Special Electrical Machines. Servo Motors. Linear Electric Machines. Permanent Magnet Axial Flux (PMAF) Machines. Bibliography. Index.

Latest Print 2014 / 280 pp. / 17.8 × 23.5 cm

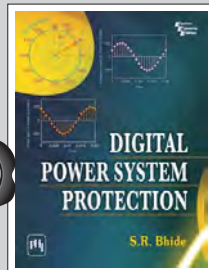
ISBN-978-81-203-4880-6 / ₹ 250.00



## ENGINEERING

### Electrical/Electronics (ELECTRICAL POWER SYSTEMS)

#### Digital Power System Protection



**S.R. BHIDE**, Associate Professor of Electrical Engineering at the Visvesvaraya National Institute of Technology, Nagpur, where he has been serving since 1984. He is a life member of ISTE.

Digital power system protection, as a subject, offers the use of computers in power line relaying which is the act of automatically controlling the power system via instrumentation and control devices. This book is an attempt to make a gentle introduction to the nitty-gritty of digital relays. Written in a simple, clear and student-friendly style, this text covers basics of digital processing of analog signals for the purpose of relaying. All important basic algorithms that are used in various types of digital relays have been explained. FIR and IIR filters have been presented in such a manner that students will be able to develop intuitive understanding. The book also covers DFT and FFT and synchrophasor technology in details. MATLAB programs and Excel simulations have been given to reinforce the comprehension of the algorithms.

This book has been thoroughly class-room tested and based on course notes which is primarily intended for undergraduate and postgraduate students of electrical engineering.

#### KEY FEATURES

- In-depth coverage of DSP fundamentals
- Pedagogical tools like figures, flowcharts, block diagrams and tables have been extensively used
- Review questions are given at the end of each chapter
- Extensive references to literature on power system protection

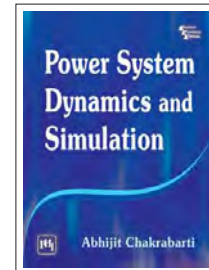
**CONTENTS:** Preface. Evolution of Power System Protection and the Emerge of Digital Relaying. Digital Signal Processing Basics and Architecture of Numerical Relay. Algorithms Based on Undistorted Single Frequency Sine Wave. Algorithms Based on Solution of Differential Equation. Algorithms Based on Least Squared Error (LSQ). Discrete Fourier Transform. FFT and Goertzel Algorithm. Windowing and Spectral Leakage. Introduction to Digital Filtering. Digital Filter Design. Synchrophasors. Removal of DC Offset. Appendix. References. Index.

Latest Print 2014 / 280 pp. / 17.8 × 23.5 cm



ISBN-978-81-203-4979-7 / ` 325.00

#### Power System Dynamics and Simulation



**ABHIJIT CHAKRABARTI**, Vice-Chairman, West Bengal State Council of Higher Education and Professor and Former Head, Department of Electrical Engineering, Bengal Engineering and Science University, Shibpur, Howrah. He has also been Vice-Chancellor of Jadavpur University.

This comprehensive textbook introduces electrical engineering students and engineers to the various aspects of power system dynamics. It focuses on explaining and analysing the dynamic performance of such systems which are important for both system operation and planning.

The aim of this book is to present a comprehensive treatise in order to study the dynamics and simulation of the power networks. After going through the complete text, the students will be able to understand fundamental dynamic behaviour and controls of power systems and to perform basic stability analysis. The topics substantiated by suitable illustrations and computer programs describe analytical aspects of operation and characteristic of power system from the view point of steady state and dynamic condition.

This text serves as a well-knit introduction to Power System Dynamics and is suitable for a one-semester course for the senior-level undergraduate students of electrical engineering and postgraduate students specializing in Power Systems.

**CONTENTS:** Preface. Introduction. Modelling of Power System Components. Steady State Operation of Uncompensated Power Transmission Lines. Transient Analysis of Power Transmission Lines. Load Flow Analysis. Power Angle Stability. Reactive Power Control and Voltage Stability. Small Signal Stability. Power System Compensation Using Fact Devices. Power Quality. Appendix.

Latest Print 2013 / 496 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4673-4 / ` 550.00

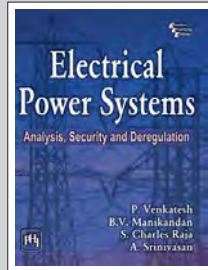


## ENGINEERING

### Electrical/Electronics (ELECTRICAL POWER SYSTEMS)

#### Electrical Power Systems: Analysis, Security and Deregulation

**P. VENKATESH**, Associate Professor in the Department of Electrical and Electronics Engineering, Thiagarajar College of Engineering, Madurai.



**B.V. MANIKANDAN**, Professor in the Department of Electrical and Electronics Engineering, Mepco Schlenk Engineering College, Sivakasi.

**S. CHARLES RAJA**, Assistant Professor in the Department of Electrical and Electronics Engineering, Thiagarajar College of Engineering, Madurai.

**A. SRINIVASAN**, Assistant Professor in the Department of Electrical and Electronics Engineering, K.L.N. College of Engineering, Pottapalayam.

This textbook introduces electrical engineering students to the most relevant concepts and techniques in three major areas today in power system engineering, namely *analysis*, *security* and *deregulation*. The book carefully integrates theory and practical applications. It emphasizes power flow analysis, details analysis problems in systems with fault conditions, and discusses transient stability problems as well. In addition, students can acquire software development skills in MATLAB and in the usage of state-of-the-art software tools such as Power World Simulator (PWS) and Siemens PSS/E.

In any energy management/operations control centre, the knowledge of contingency analysis, state estimation and optimal power flow is of utmost importance. Part 2 of the book provides comprehensive coverage of these topics. The key issues in electricity deregulation and restructuring of power systems such as Transmission Pricing, Availability Transfer Capability (ATC), and pricing methods in the context of Indian scenario are discussed in detail in Part 3 of the book.

The book is interspersed with problems for a sound understanding of various aspects of power systems. The questions at the end of each chapter are provided to reinforce the knowledge of students as well as prepare them from the examination point of view. The book will be useful to both the undergraduate students of electrical engineering and postgraduate students of power engineering and power management in several courses such as Power System Analysis, Electricity Deregulation, Power System Security, Restructured Power Systems, as well as laboratory courses in Power System Simulation.

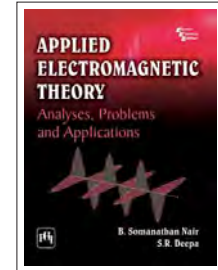
**CONTENTS:** Preface. Part I: Power System Analysis—Introduction: Power System. Load Flow Analysis. Symmetrical Fault Analysis. Unsymmetrical Fault Analysis. Power System Stability. Part II: Power System Security—Operations In Power System Security. State Estimation. Optimal Power Flow. Part III: Deregulation—Power System Restructuring: An Overview. Operations In Power Market. Available Transfer Capability. Transmission Open Access and Pricing. Bibliography. Index.



Latest Print 2014 / 528 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4538-6 / ` 375.00

### Electrical/Electronics (ELECTROMAGNETICS)

#### Applied Electromagnetic Theory: Analysis, Problems and Applications



**B. SOMANATHAN NAIR**, Principal, Pankaja Kasthuri College of Engineering and Technology, Thiruvananthapuram (Kerala).

**S.R. DEEPA**, Director and Associate Professor, B.S. Nair's Institute of Electronics Engineering, Thiruvananthapuram.

Designed as a textbook for the students of electronics and communication engineering, and electrical and electronics engineering, it covers the subject of electromagnetism with a clear exposition of the theory in association with the practical applications. The text explains the physical and mathematical aspects of the highly complicated electromagnetic theory in a very simple manner.

The book begins with an introductory chapter on vector theory and then moves on to explain the effectiveness of Ampere's circuital law and Biot-Savart's law in dealing with magnetostatic problems, derivation of Maxwell's field equations from the fundamental laws of Faraday and Ampere, free-space solutions of wave equations, and the theory of skin effect. Finally, it concludes with the applications of Smith chart in solving transmission line problems and the theory of rectangular and circular waveguides.

#### KEY FEATURES

- Large number of solved examples and chapter-end problems
- Appendices to give the solutions of wave equations in waveguides
- Three-dimensional figures to illustrate theories
- Generalized solution of Maxwell's equations

Besides undergraduate students of engineering, it would be useful for the postgraduate students of physics.

**CONTENTS:** Preface. Introduction to Vector Theory. MODULE I—Coulomb's Law and Its Applications. Poisson's and Laplace's Equations. Magnetostatics. Maxwell's Equations. Poynting's Theorem. MODULE II—Electromagnetic Waves. Reflection and Refraction of Plane Waves. Uniform Transmission Lines. MODULE III—Impedance Matching Using Stub Lines. Rectangular and Circular Waveguides. Appendices—A: Transverse Electric (TE) Waves in Rectangular Waveguides. B: Circular Cylindrical Waveguides. C: Properties of Materials. Bibliography. Index.

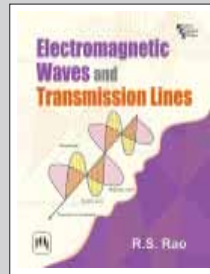
Latest Print 2010 / 384 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3339-0 / ` 325.00



## ENGINEERING

### Electrical/Electronics (ELECTROMAGNETICS)

#### Electromagnetic Waves and Transmission Lines



**R.S. RAO**, Professor in the Department of Electronics and Communication Engineering, Sree Vidyanikethan Engineering College, Tirupathi.

This systematic and well-written book provides an in-depth analysis of all the major areas of the subject such as fields, waves and lines. It is written in a simple and an easy-to-understand language.

Beginning with a discussion on vector calculus, the book elaborately explains electrostatics, including the concepts of electric force and field intensity, electric displacement, Gauss law, conductors, dielectrics and capacitors. This is followed by a detailed study of magnetostatics, covering Biot-Savart law, Lorentz's force law and Ampere's circuital law. Then, it discusses Maxwell's equations that describe the time-varying fields and the wave theory which is the basis of radiation and wireless communications. Finally, the book gives a fair treatment to transmission line theory, which is a foundation course in mechanical engineering.

The text is well-supported by a large number of solved and unsolved problems to enhance the analytical skill of the students. The problems are framed to test the conceptual understanding of the students. It also includes plenty of objective type questions with answers.

It is intended as a textbook for the undergraduate students of Electrical and Electronics Engineering and Electronics and Communication Engineering for their course on Electromagnetic Waves and Transmission Lines.

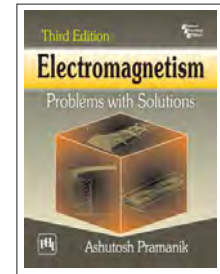
**CONTENTS:** Preface. Acknowledgements. Unit I: Vector Calculus—Vector Calculus. Unit II: Electrostatics—Electric Force and Field Intensity. Electric Displacement and Gauss Law. Electric Potential and Energy. Conductors, Dielectrics and Capacitors. Unit III: Steady Magnetic Fields—Magnetostatics. Unit IV: Electrodynamics—Time Varying Fields and Maxwell's Equations. Unit V: Wave Theory—Electromagnetic Wave Theory. Transmission and Reflection. Guided Waves and Waveguides. Unit VI: Transmission Line Theory—Line Equations and Impedance. Reflection Coefficient and Standing Wave Ratio. Line Distortion and Line Matching. Appendix. Important Equations. Index.

Latest Print 2012 / 592 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4515-7 / 425.00



PHI Learning: Publications

#### Electromagnetism: Problems with Solutions, 3rd ed.



**A. PRAMANIK** has been D.J. Gandhi Distinguished Visiting Professor in the Department of Electrical Engineering at IIT Bombay. Currently he is Professor Emeritus in the Department of Electrical Engineering at the College of Engineering, Pune.

This **Third Edition** of the book contains more than 60 new problems over and above the original 480 problems of the Second Edition. The additional problems cover the whole range of new topics which will also be introduced in the third edition of the author's main textbook titled *Electromagnetism: Theory and Applications*. There are some other new problems necessary to further enhance the understanding of the topics of importance already existing in the book.

There has been no change in the philosophy of this book. It has been designed to serve as a companion volume to the main text to help students gain a thorough quantitative understanding of EM concepts that are somewhat difficult to learn. The problems included, as a result of the author's long industrial and academic experience, illuminate the concepts developed in the main text.

Besides meeting the needs of undergraduate students of electrical engineering and postgraduate students and researchers in physics, the book will also be immensely useful to engineers and applied physicists in industry.

**CONTENTS:** Preface. Preface to the Second Edition. Preface to the First Edition. Vector Analysis. Electrostatics I. Electrostatics II—Dielectrics, Conductors and Capacitance. Electrostatic Field Problems. Electric Currents (Steady). Magnetostatics I. Electromagnetic Induction and Quasi-static Magnetic Fields. Forces and Energy in Static and Quasi-static Magnetic Systems (with inductance calculations). Maxwell's Equations. Vector Potentials and Applications. Poynting Vector and Energy Transfer. Magnetic Diffusion (Eddy Currents) and Charge Relaxation. Electromagnetic Waves—Propagation, Guidance and Radiation. Electromagnetism and Relativity. Appendices—1: Roth's Method. 2: Solid Angles. 3: Poynting Vector: A Proof. 4: Magnetic and Electric Fields in Poynting Vector: A Proof. 5: Bicylindrical Coordinate System and Associated Conformal Transformations. Bibliography.

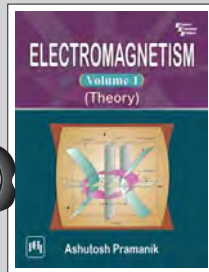
Latest Print 2012 / 920 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4633-8 / 550.00



## ENGINEERING

### Electrical/Electronics (ELECTROMAGNETICS)

#### Electromagnetism Volume I (Theory)



**A. PRAMANIK** has been D.J. Gandhi Distinguished Visiting Professor in the Department of Electrical Engineering at IIT Bombay. Currently he is Professor Emeritus in the Department of Electrical Engineering at the College of Engineering, Pune.

This book [earlier titled as *Electromagnetism: Theory and Applications* which is bifurcated into two volumes: *Electromagnetism: Theory* and *Electromagnetism: Applications (Magnetic Diffusion and Electromagnetic Waves)* has been updated to cover some additional aspects of theory and nearly all modern applications. The semi-historical approach is unchanged, but further historical comments have been introduced at various places in the book to give a better insight into the development of the subject as well as to make the study more interesting and palatable to the students.

Appendices contain in-depth analysis of self-inductance and non-conservative fields (Appendix 6), proof regarding the boundary conditions (Appendix 8), theory of bicylindrical co-ordinate system to provide the physical basis of the circuit approach to the cylindrical transmission line systems (Appendix 10), and properties of useful functions like Bessel and Legendre functions (Appendix 9).

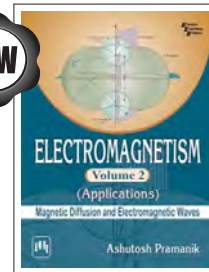
The book is designed to serve as a core text for students of electrical engineering. Besides, it will be useful to postgraduate physics students as well as research engineers and design and development engineers in industries.

**CONTENTS:** Preface. Preface to the First Edition. Vector Analysis. The Electrostatic Field in Free Space (in Absence of Dielectrics). Conductors and Insulators in Electrostatic Field. Energy and Mechanical Forces in Electrostatic Fields. Methods of Solving Electrostatic Field Problems. Approximate Methods of Solving Electrostatic Field Problems. Steady Electric Current and Electric Field. Magnetic Field of Steady Currents in Free Space. Magnetic Field of Steady Currents in Presence of Magnetic Materials. Methods of Solving Magnetostatic Field Problems. Time-Varying Fields and Electromagnetic Induction. Forces and Energy in the Static and Quasi-Static Magnetic Fields. Maxwell's Equations. Vector Potentials. Energy Transfer in Electromagnetic Fields and Poynting Vector. Appendices. Index.

Latest Print 2014 / 696 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4888-2 / ` 525.00



#### Electromagnetism Volume II— Applications (Magnetic Diffusion and Electromagnetic Waves)



**A. PRAMANIK** has been D.J. Gandhi Distinguished Visiting Professor in the Department of Electrical Engineering at IIT Bombay. Currently he is Professor Emeritus in the Department of Electrical Engineering at the College of Engineering, Pune.

This book is a sequel to *Electromagnetism: Theory* (Volume I). It has been updated to cover some additional aspects of theory and nearly all modern applications. The semi-historical approach is unchanged, but further historical comments have been introduced at various places in the book to give a better insight into the development of the subject as well as to make the study more interesting and palatable to the students.

#### KEY FEATURES

- Emphasis on practical aspects of wave guidance and radiation
- Sections on analysis of cylindrical dielectric waveguide (e.g. of optical fibres) in Chapters 18 and 22
- Tensor formulation of Maxwell's Stresses
- Extension of Principle of Duality to time varying field problems as well as to non electrical systems
- Extrapolation of the method of images from partially embedded conduction current elements to discontinuous current elements with displacement currents in antennae problems
- Explanation of the physical basis of the mechanism of electromagnetic radiation
- Analysis of wave polarization including complete and partial polarization
- Effects of finite geometrical dimensions of the conducting media on the skin-effect phenomenon
- Types of apertures in receiving antennae

The book is designed to serve as a core text for students of electrical engineering. Besides, it will be useful to postgraduate physics students as well as research engineers and design and development engineers in industries.

**CONTENTS:** Preface. Time-Varying Fields in Conductors (Magnetic Diffusion). Charge Relaxation. Electromagnetic Waves. Waveguides. Radiation and Reception of Electromagnetic Waves. Electromagnetism and Special Relativity. Numerical Methods for and Computer Solutions of Electromagnetic Field Problems. Modern Topics and Applications. Appendices. Index.

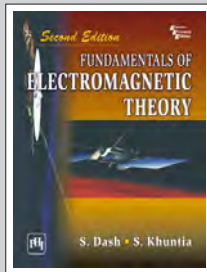
Latest Print 2014 / 580 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4901-8 / ` 525.00



## ENGINEERING

### Electrical/Electronics (ELECTROMAGNETICS)

#### Fundamentals of Electromagnetic Theory, 2nd ed.



**SAROJ K. DASH**, Professor and Head, Department of Electrical Engineering, Gandhi Institute for Technological Advancement, Bhubaneswar.

**SMRUTI R. KHUNTIA**, R&D Unit, Trisoft Technology, Bhubaneswar.

The Second Edition of this book, while retaining the contents and style of the first edition, continues to fulfil the requirements of the course curriculum in Electromagnetic Theory for the undergraduate students of electrical engineering, electronics and telecommunication engineering, and electronics and communication engineering.

The text covers the modules of the syllabus corresponding to vectors and fields, Maxwell's equations in integral form and differential form, wave propagation in free space and material media, transmission line analysis and waveguide principles. It explains physical and mathematical aspects of the highly complicated electromagnetic theory in a very simple and lucid manner. This new edition includes:

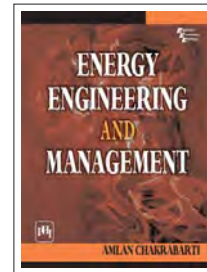
- Two separate chapters on *Transmission Line* and *Waveguide*
- A thoroughly revised chapter on *Plane Wave Propagation*
- Several new solved and unsolved numerical problems asked in various universities' examinations

**CONTENTS:** Preface. Preface to the First Edition. Acknowledgements. Fundamentals of Vector Algebra. Concept of Vector Calculus. Electrostatics. Magnetostatics. Electrodynamics. Plane Wave Propagation. Transmission Line. Waveguide. Antenna. Appendices. Solved Question Papers. Index.

Latest Print 2011 / 920 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4396-2 / ₹ 525.00

### Electrical/Electronics (ENERGY STUDIES)

#### 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 2013 / 264 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4233-0 / ₹ 295.00



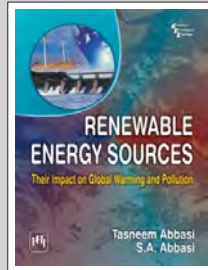


## ENGINEERING

### Electrical/Electronics (ENERGY STUDIES)

#### Renewable Energy Sources: Their Impact on Global Warming and Pollution

**TASNEEM ABBASI**, Assistant Professor, Centre for Pollution Control and Energy Technology, Pondicherry University, Pondicherry.



**S.A. ABBASI**, Senior Professor and Coordinator, Centre for Pollution Control and Energy Technology, 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.**

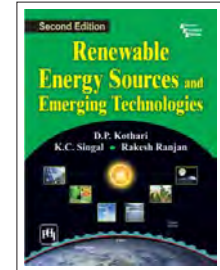
— Dr. FAROOQ ABDULLAH  
Hon'ble Minister, New and Renewable Energy  
Government of India

**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. 8. Tidal Energy. Geothermal Energy. Small Hydro. Hydrogen as a Renewable Energy Source. Storage of Intermittently-generated Renewable Energy. Decarboni-zation of Fossil Fuel Use by CO<sub>2</sub> Capture. Is the Use of Renewable Energy Sources an Answer to the Problems of Global Warming and Pollution? References. Index.

Latest Print 2013 / 332 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3994-1 / 325.00



#### Renewable Energy Sources and Emerging Technologies, 2nd ed.



**D.P. KOTHARI**, Director General of Vindhya Group of Institutions, Indore.

**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.

**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.

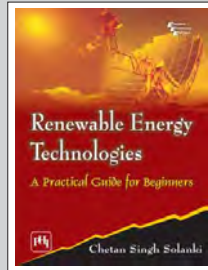
Latest Print 2014 / 456 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4470-9 / 325.00



## ENGINEERING

### Electrical/Electronics (ENERGY STUDIES)

#### Renewable Energy Technologies: A Practical Guide for Beginners



**CHETAN SINGH SOLANKI**, Associate Professor, Department of Energy Science and Engineering, Indian Institute of Technology Bombay (IITB).

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.

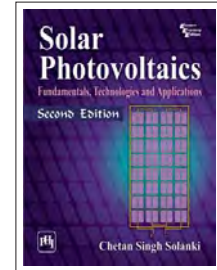
**CONTENTS:** Preface. List of Abbreviations. Basics of Energy. Solar Radiation. Solar Photovoltaic Technologies. Solar Thermal Technologies. Wind Energy. Biomass Energy. Appendices—A: Monthly Averaged Daily Solar Radiation. B: Global Annual Solar Radiation Map of India. C: Wind Energy Distribution Map of India. D: Typical Power Ratings of Energy Appliances. E: Physical Constants and Conversion Factors. F: Subsidies and Manufacturers. Index.

Latest Print 2013 / 168 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-3434-2 / ₹ 225.00



#### Solar Photovoltaics: Fundamentals, Technologies and Applications, 2nd ed.



**CHETAN SINGH SOLANKI**, Associate Professor, Department of Energy Science and Engineering, Indian Institute of Technology Bombay (IITB).

This thoroughly revised text, now in its *second 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.

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.

This text is intended for the undergraduate and post-graduate students of engineering for their courses on solar photovoltaic technologies and renewable energy technologies. Besides this, the book will be immensely useful 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. 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. Bibliography. Index.

Latest Print 2013 / 512 pp. / 17.8 × 23.5 cm

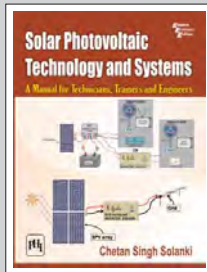
ISBN-978-81-203-4386-3 / ₹ 495.00



## ENGINEERING

### Electrical/Electronics (ENERGY STUDIES)

#### Solar Photovoltaic Technology and Systems: A Manual for Technicians, Trainers and Engineers



**CHETAN SINGH SOLANKI**, Associate Professor, Department of Energy Science and Engineering, Indian Institute of Technology Bombay (IITB).

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.

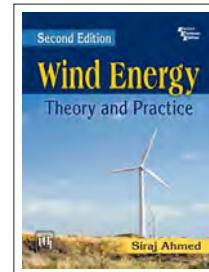
The text is intended for technicians, trainers and engineers who are working on solar PV systems for design, installation and maintenance of solar PV systems.

**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

#### 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 2013 / 352 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4490-7 / ₹ 395.00



## ENGINEERING

### Electrical/Electronics (ENERGY STUDIES)

#### 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.

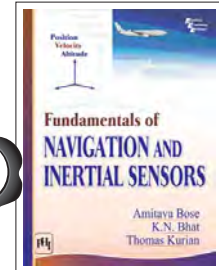
**CONTENTS:** Preface. Renewable Energy Technologies. The Wind Resource. The Wind Power Plant. Wind Energy Conversion. Wind Turbine Aerodynamics. Wind Power Control Strategies. Constant Speed Wind Power Plants. Variable Speed Wind Power Plants. Quality Issues of Wind Power. Grid Integration of Wind Power. Wind Resource Assessment Technologies. Wind Power Plant Design Considerations. Small Wind Turbines. Wind Project Life Cycle. Index.



Latest Print 2014 / 484 pp. / 21.6 × 27.8 cm  
ISBN-978-81-203-4778-6 / ₹ 475.00

### Electrical/Electronics (INERTIAL NAVIGATION)

#### Fundamentals of Navigation and Inertial Sensors



**AMITAVA BOSE**, Former Director, Indian Space Research Organisation and INAE Distinguished Visiting Professor.

**K.N. BHATT**, He has been at the Centre for Nanoscience and Engineering, Indian Institute of Science Bangalore, teaching courses on Nano devices and MEMS Technology.

**THOMAS KURIAN**, Dean R&D and Head of the Department of Avionics in Indian Institute of Space Science and Technology, Thiruvananthapuram.

Navigation fundamentally provides information on position, velocity and direction which are needed for travel in ocean, land, air and in space. This information has been extremely useful to the growth of civilization through the ages. It is quite expected that myriad forms of navigation developed during this long period leading to current versions which are collectively called modern navigation or simply 'navigation'. Navigation has different types, such as, inertial navigation, satellite navigation, radio navigation, stellar navigation and integrated inertial navigation.

The book, *fundamentals of navigation and inertial sensors*, has focused on topics related to inertial navigation, inertial sensors, MEMS based inertial sensors, satellite navigation, integrated inertial navigation, signal processing of inertial sensors and lastly their applications.

Besides being an ideal introduction to the topics, the book has aimed to meet the academic needs of undergraduate and postgraduate courses for students in aerospace engineering as well as in Avionics.

**CONTENTS:** Preface. Acknowledgements. Acronyms. Introduction to Navigation. Autonomous Strapdown Inertial Navigation. Gyros. Accelerometer. MEMS Based Inertial Sensors. Satellite Navigation. Integrated Inertial Navigation. Signal Processing of Inertial Sensors. Application of Navigation and Inertial Sensors. Appendices—A: Laser Principle and Basic Characteristics for Gyro. B: Fibre Optics Features and Basic Characteristics. C: Quality Factor. D: Inertial Sensor Noise. E: Glossary. F: Symbols. References. Index.

Latest Print 2014 / 340 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4859-2 / ₹ 425.00



## ENGINEERING

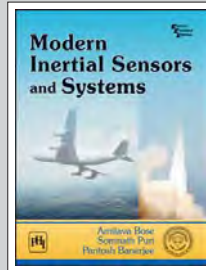
### Electrical/Electronics (INERTIAL NAVIGATION)

#### Modern Inertial Sensors and Systems

**AMITAVA BOSE**, *Former Director, Indian Space Research Organisation and INAE Distinguished Visiting Professor.*

**SOMNATH PURI**, *Former Deputy Director, Indian Space Research Organisation Currently Dean, Mody Institute of Technology and Science.*

**PARITOSH BANERJEE**, *Former Dean and Director, Electro-Optics Instrument Research Academy.*



Modern inertial sensors and systems cover more than five decades of continuous research and development involving various branches of science and engineering. Various technologies have emerged in an evolutionary manner surpassing the earlier ones in performance and reliability. The subject is still growing with proliferation in newer cost effective applications, while its wider usage in aerospace systems continues.

This book exposes the readers to the subject of inertial navigation, the inertial sensors and inertial systems in a unified manner while emphasizing the growth areas in emerging technologies such as micro-electromechanical inertial sensors, satellite navigation, satellite navigation integrated inertial navigation, hemispherical resonator gyro, vibrating beam accelerometer, interferometric fibre optic gyro, inertial sensor signal processing, redundant inertial systems and the quite recent emergence of cold atom interferometer based inertial sensors. The contents are imaginatively designed that will of interest to a wide spectrum of readers. The book has been written with utmost lucidity and clarity and explanations provided with a large number of illustrative figures.

Besides being an ideal introduction to the principles of inertial sensors and systems for undergraduate and postgraduate students of aerospace engineering, the topics dealt with will also be of benefit to practising engineers and can assist the researchers to locate excellent references for research work.

The authors have had three decades of design and application research experience in premier research institutions and have made use of their experience in giving a user-friendly shape to the book.

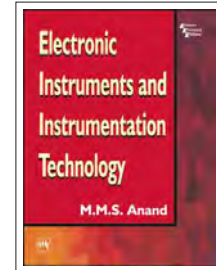
**CONTENTS:** Preface. Acknowledgements. Introduction to Modern Navigation. Autonomous Inertial Navigation System. Satellite Navigation System. Accelerometers. Gyros. Micro Electromechanical Inertial Sensors. Inertial Sensors Signal Processing. Inertial System Technology. Integrated Inertial Navigation. Testing of Inertial Sensors and Systems. Applications. Appendices—A: Basic Physics in Inertial Navigation. B: Glossary. C: Acronyms. D: Symbols. Index.

Latest Print 2009 / 416 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3353-6 / ₹ 395.00

### Electrical/Electronics (INSTRUMENTATION)

#### Electronic Instruments and Instrumentation Technology

**M.M.S. ANAND**, *Professor of Electronics and Instrumentation at Birla Institute of Technology & Science, Pilani. Presently, he also holds the position of Registrar of the Institute.*



This book provides a firm foundation in the principles, operation, design, and applications of electronic instruments. Beginning with electromechanical instruments, specialized instruments such as signal analyzers, counters, signal generators, and digital storage oscilloscope are treated in detail.

Good design practices such as grounding and shielding are emphasized. The standards in quality management, basics of testing, compatibility, calibration, traceability, metrology and various ISO 9000 quality assurance guidelines are explained as well. A chapter is also devoted to the study of communication methods used in instrumentation technology.

In addition, the technology and standards used in hazardous areas are also discussed.

An instrumentation engineer is expected to draw and understand the instrumentation drawings. An Appendix explains the symbols and standards used in P&I diagrams with several examples.

Besides worked-out examples included throughout, end-of-chapter questions and multiple choice questions are also given to strengthen the student's understanding of the subject.

Practical and state-of-the-art in approach, this textbook will be useful for students of electrical, electronics, and instrumentation engineering.

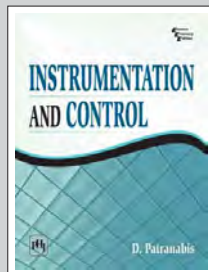
**CONTENTS:** Preface. Section I: Instruments and Accessories—Analog Meters. Digital Meters. Analog and Digital Oscilloscopes. Probes. Bridge Instruments. Recorders and Data Loggers. Signal Generators. Signal Analyzers. Electronic Counters. Section II: Instrument Design and Manufacturing Techniques—Grounding and Shielding. Elements of Design. Metrology. Standards in Quality Management. Section III: Instrumentation Technology—Industrial Communication Techniques. Instrumentation in Hazardous Areas. Appendices—A: Attenuators. B: Terminology Used in Hazardous Area Applications. C: Instrumentation Symbols and P&I Diagrams. D: Typical Technical Specifications of Instruments. E: Multiple Choice Questions. Bibliography. Answers to Numerical Questions. Index.

Latest Print 2013 / 744 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2454-1 / ₹ 395.00

## ENGINEERING

Electrical/Electronics (INSTRUMENTATION)

### Instrumentation and Control



**D. PATRANABIS**, Professor Emeritus, Department of Applied Electronics and Instrumentation Engineering, Heritage Institute of Technology, Kolkata.

Instrumentation and control plays a crucial role in the field of automation. This book presents an in-depth analysis of the essential concepts of the instrumentation and control systems.

The book introduces the students to instrumentation system and explains its designs, component selection and environmental effects. The statistical methods of data analysis and estimation of uncertainties are presented for an appropriate evaluation of the measured values. Dimensional metrology including the recent advancements is presented in an easy-to-grasp manner. The book also covers measurement of force, torque, shaft power and acceleration besides discussing signal conditioning and various display devices in a simple but effective style. Finally, it explains the time and frequency-measuring system, control theory and practice and various measurement-instruments as well as the nuclear techniques.

Designed for undergraduate and postgraduate students of electrical and instrumentation engineering, electrical and electronics engineering and mechanical engineering, this book will also be equally useful for the practising engineers and professionals.

#### KEY FEATURES

- Contains numerous figures and tables to clarify the concepts.
- Incorporates solved examples to impart practical knowledge to the students.
- Provides chapter-end review exercises to test students' understanding of the subject.

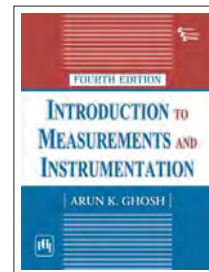
**CONTENTS:** Preface. Instrumentation System. Statistical Error Analysis. Metrology. Sensors and Transducers. Strain Gauges. Measurement of Force, Torque, Shaft Power, Speed and Acceleration. Measurement of Process Variables, Pressure, Temperature, Flow and Level. Signal Conditioning. Display Devices. Determination of Count and Measurement of Time, Time Interval and Frequency. Control. Measurement of Miscellaneous Parameters and Variables. Index



Latest Print 2011 / 392 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4246-0 / ₹ 325.00

PHI Learning: Publications

### Introduction to Measurements and Instrumentation, 4th ed.



**ARUN K. GHOSH**, Visiting Professor, Sir J.C. Bose School of Engineering, Hooghly.

The fourth edition of this highly readable and well-received book presents the subject of measurement and instrumentation systems as an integrated and coherent text suitable for a one-semester course for undergraduate students of Instrumentation Engineering, as well as for instrumentation course/paper for Electrical/Electronics disciplines.

Modern scientific world requires an increasing number of complex measurements and instruments. The subject matter of this well-planned text is designed to ensure that the students gain a thorough understanding of the concepts and principles of measurement of physical quantities and the related transducers and instruments. This edition retains all the features of its previous editions viz. plenty of worked-out examples, review questions culled from examination papers of various universities for practice and the solutions to numerical problems and other additional information in appendices.

#### NEW TO THIS EDITION

Besides the inclusion of a new chapter on *Hazardous Areas and Instrumentation* (Chapter 15), various new sections have been added and existing sections modified in the following chapters:

- Chapter 3: *Linearisation and Spline interpolation.*
- Chapter 5: Classifications of transducers, Hall effect, Piezoresistivity, Surface acoustic waves, Optical effects (This chapter has been thoroughly modified).
- Chapter 6: *Proximity sensors.*
- Chapter 8: *Hall effect and Saw transducers.*
- Chapter 9: *Proving ring, Prony brake, Industrial weighing systems, Tachometers.*
- Chapter 10: *ITS-90, SAW thermometer.*
- Chapter 12: *Glass gauge, Level switches, Zero suppression and Zero elevation, Level switches.*
- Chapter 13: The section on *ISFET* has been modified substantially.

**CONTENTS:** Foreword. Preface. Preface to the First Edition. List of Abbreviations. Introduction. Static Characteristics of Instruments. Estimation of Static Errors and Reliability. Dynamic Characteristics of Instruments. Transducers. Displacement Measurement. Strain Measurement. Pressure Measurement. Acceleration, Force and Torque Measurement. Temperature Measurement. Flow Measurement. Level Measurement. Miscellaneous Measurements. Analytical Instrumentation. Hazardous Areas and Instrumentation. Signal Conditioning. Display Devices and Recording Systems. Appendices—A: Variance of Combinations. B: Linear Time-invariant Systems. C: Laplace Transform. D: Statistical Tables. E: Psychrometric Table. F: Miscellaneous Data. G: Solutions to Numerical Problems. Index.

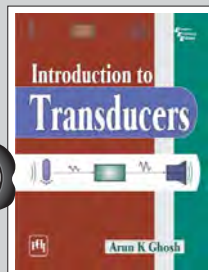
Latest Print 2013 / 940 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4625-3 / ₹ 550.00



## ENGINEERING

### Electrical/Electronics (INSTRUMENTATION)

#### Introduction to Transducers



**ARUN K. GHOSH**, *Visiting Professor at Sir JC Bose School of Engineering, Hooghly.*

Primarily intended as a textbook for undergraduate courses in applied electronics and instrumentation engineering, instrumentation and control engineering, electrical and electronics engineering and electronics and telecommunication engineering, this student-friendly book provides an in-depth coverage of transducers.

Organised in 12 chapters, the book

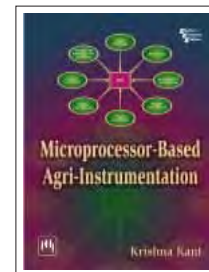
- presents a comprehensive classification of transducers based on common properties such as mechanical, resistive, inductive, capacitive, piezoelectric, magnetic, fibre-optic, ultrasonic and electrochemical;
- discusses the general principles of each group, showing their applications in sensing physical quantities such as pressure, temperature and so on;
- outlines the distinguishing features of transducers and elaborates on modern sensors based on optical fibres (intensity modulated, phase modulated and spectrally modulated sensors such as Bragg grating, Fabry-Pérot interferometer, Brillouin scattering sensor) and sensors based on surface acoustic wave; and
- contains numerous solved examples and review questions that illustrate the application of theory to reinforce the concepts.

**CONTENTS:** Preface. Acronyms. Introduction. Mechanical Transducers. Resistive Transducers. Inductive Transducers. Capacitive Transducers. Piezoelectric Transducers. Magnetic Transducers. Radiation Sensors. Thermal Sensors. Fibre-optic Transducers. Ultrasonic Transducers. Electrochemical Transducers. Appendix: Magnetic Field in a Solenoid. Index.



Latest Print 2014 / 344 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-5039-7 / 375.00

#### Microprocessor-Based Agri-Instrumentation



**KRISHNA KANT**, *Former Senior Director in the Department of Information Technology, Ministry of Communication and Information Technology.*

This book provides the fundamental concepts of system design using microprocessors in the field of agriculture instrumentation. It begins with an introduction to the field of agriculture and application of instrumentation in agriculture, and the book then covers the transducers specific to the agricultural field. The binary number system and arithmetic are covered as the basic building block of digital circuits and computer organization. The microprocessor basics and Intel 8085 hardware and software have been discussed in detail. The book describes microprocessor peripheral interfacing and its support chips such as Intel 8225, Intel 8253 and Intel 8279 along with their applications. It discusses analog to digital and digital to analog interface, CRT terminal interface and printer interface. In addition, the book includes case studies on various microprocessor applications in agriculture, such as microprocessor-based system design for grain moisture, safe grain storage, soil nutrient estimation and drip irrigation. Finally, the book ends with an advanced and futuristic topic on precision agriculture to give an exposure to students about future developments in the agricultural system.

#### KEY FEATURES

- From concepts to design, the book follows a step-by-step approach.
- Gives a large number of figures for easy understanding of theory.
- Includes a good number of examples and end-of-chapter exercises both in the hardware and software sections.
- Presents a number of case studies on the design of microprocessor-based agri-instrumentation systems.
- Offers exercises on the case studies which can be used for further development of the concepts.

The book is primarily intended for the undergraduate and postgraduate students of agricultural engineering for their courses on agri instrumentation and microprocessor applications in agriculture.

**CONTENTS:** Preface. Introduction. Agri Transducers. Binary Number System and Arithmetic. Basic Computer Organization. Introduction to Microprocessor Architecture. Sample and Hold Amplifier, Multiplexer, Digital to Analog and Analog to Digital Converters. Intel 8085 Microprocessor Hardware Architecture. Intel 8085 Microprocessor Instrumentation Set and Programming. Microprocessor Peripheral Interfacing. Microprocessor Applications in Agriculture—Case Studies. Precision Agriculture. Appendix. Index.

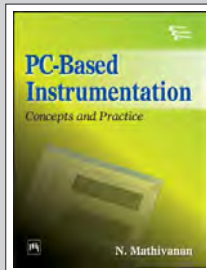
Latest Print 2010 / 616 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4086-2 / 395.00



## ENGINEERING

### Electrical/Electronics (INSTRUMENTATION)

#### PC-Based Instrumentation: Concepts and Practice



**N. MATHIVANAN**, Director, University Science Instrumentation Centre, Madurai Kamaraj University, Madurai. He is also the Head In-Charge of the University Computer Centre.

This well-organized book is intended for the undergraduate students of Electrical, Electronics and Communications, Computer, Instrumentation and Instrumentation and Control Engineering; and postgraduate students of science in Electronics, Physics and Instrumentation.

Data acquisition being the core of all PC-based measurements and control instrumentation systems engineering, this book presents detailed discussions on PC bus based data acquisition, remote data acquisition, GPIB data acquisition and networked data acquisition configurations. This book also describes sensors, signal-conditioning and principles of PC-based data acquisition. It provides several latest and advanced techniques. This book stresses the need for understanding the use of Personal Computers in measurement and control instrumentation applications.

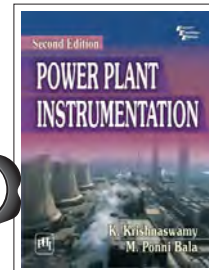
#### KEY FEATURES

- Provides several laboratory experiments to help the readers to gain hands-on experience in PC-based measurement and control.
- Provides a number of review questions/problems (with solutions to the odd numbered problems) and objective type questions with solutions.
- Presents a number of working circuits, design and programming examples.
- Presents comparison of properties, features and characteristics of different bus systems, interface standards, and network protocols.
- Includes the advanced techniques such as sigma-delta converter, RS-485, I2C bus, SPI bus, FireWire, IEEE-488.2, SCPI and Fieldbus standards.

**CONTENTS:** Foreword. Preface. Introduction. Signal-Conditioning and Op Amp Circuits. Sensors and Actuators. Principles of Data Acquisition. Hardware Organization of IBM PC. Interfacing to IBM PC. Plug-in Data Acquisition and Control Boards. 8. Data Acquisition Using GPIB. Data Acquisition Using Serial Interfaces. Networked Data Acquisition. Appendices. Bibliography. Index.

Latest Print 2013 / 700 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3076-4 / ₹ 395.00

#### Power Plant Instrumentation, 2nd ed.



**K. KRISHNASWAMY**, Dean, Curriculum Development and Student Affairs, Kongu Engineering College, Erode, Tamil Nadu.  
**M. PONNI BALA** is with the Department of Electronics and Instrumentation Engineering, Kongu Engineering College.

The second edition of this text presents an overview of power generation and discusses the different types of equipment used in a steam thermal power generation unit.

The book describes various conventional and non-conventional energy sources. It elaborates on the instrumentation and control of water-steam and fuel-air flue gas circuits along with optimization of combustion. The text also deals with the power plant management system including the combustion process, boiler efficiency calculation, and maintenance and safety aspects. In addition, the book explains Supervisory Control and Data Acquisition (SCADA) system as well as turbine monitoring and control.

This book is designed for the undergraduate students of electronics and instrumentation engineering and electrical and electronics engineering.

#### New To This Edition

- A new chapter on Nuclear Power Plant Instrumentation is added, which elaborates how electricity is generated in a Nuclear Power Plant.

#### KEY FEATURES

- Includes numerous figures to clarify the concepts.
- Gives a number of worked-out problems to help students enhance their learning skills.
- Provides chapter-end exercises to enable students to test their understanding of the subject.

**CONTENTS:** Foreword. Preface. Preface to the First Edition. Overview of Power Generation. Instrumentation and Control in Water Circuit. Instrumentation and Control in Air-Fuel Circuit. Power Plant Management. Turbine—Monitoring and Control. Nuclear Power Plant Instrumentation. Index.

Latest Print 2013 / 320 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4824-0 / ₹ 295.00



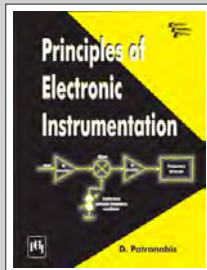


## ENGINEERING

### Electrical/Electronics (INSTRUMENTATION)

#### Principles of Electronic Instrumentation

**D. PATRANABIS**, *Professor Emeritus, Heritage Institute of Technology, Kolkata.*



This text offers comprehensive coverage of electronic instruments and electronics-aided measurements, highlighting the essential components of digital electronic instrumentation and the principles involved in electrical and electronic measurement processes. It also explains the stages involved in data acquisition systems for acquiring, manipulating, processing, storing, displaying and interpreting the sought-for data.

The principal instruments presented in this book include cathode ray oscilloscope (CRO), analyzers, signal generators, oscillators, frequency synthesizers, sweep generators, function generators and attenuators. Besides, the book covers several laboratory meters such as phase meters, frequency meters, Q-meters, wattmeters, energy meters, power factor meters, and measurement bridges. Also included are a few important sensors and transducers which are used in the measurement of temperature, pressure, flow rate, liquid level, force, etc.

The book also emphasizes the growing use of fibre optic instrumentation. It explains some typical fibre optic sensing systems including the fibre optic gyroscope. Some applications of optical fibre in biomedical area are described as well.

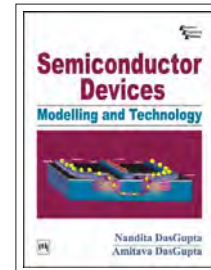
The book is intended for a course on Electronic Measurements and Instrumentation prescribed for B.E./B.Tech. students of Electronics and Instrumentation Engineering, Electronics and Communication Engineering, Electronics and Control Engineering, and Electronics and Computer Engineering. It will also be a useful book for diploma level students pursuing courses in electrical/electronics/instrumentation disciplines.

A variety of worked-out examples and exercises serve to illustrate and test the understanding of the underlying concepts and principles.

**CONTENTS:** Preface. Basic Concepts. Measurement of Electrical Quantities. Digital Elements and Features. Combinational and Sequential Logic Circuits. Analogue-to-Digital and Digital-to-Analogue Converters. Cathode-Ray Oscilloscope. Phase, Frequency, Time. Q-Factor, Power and Power Factor. Analyzers. Bridge Circuits. Test Signal Generation. Display, Record and Acquisition of Data. Shielding and Grounding. Transducers and the Measurement System. Fibre Optics Sensors and Instrumentation. Additional Problems with Solutions/Hints. Appendix 1: Units, Dimensions and Standards. Appendix 2: Errors and Related Topics. Appendix 3: Automated Test and Measurement Systems. Bibliography. Index.

**Latest Print 2009 / 580 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-3355-0 / ₹ 350.00**

#### Semiconductor Devices: Modelling and Technology



**NANDITA DASGUPTA**, *Associate Professor, Department of Electrical Engineering, IIT Madras.*

**AMITAVA DASGUPTA**, *Associate Professor, Department of Electrical Engineering, IIT Madras.*

Aimed primarily at the undergraduate students pursuing courses in semiconductor physics and semiconductor devices, this text emphasizes the physical understanding of the underlying principles of the subject. Since engineers use semiconductor devices as circuit elements, device models commonly used in the circuit simulators, e.g. SPICE, have been discussed in detail. Advanced topics such as lasers, heterojunction bipolar transistors, second order effects in BJTs, and MOSFETs are also covered. With such in-depth coverage and a practical approach, practising engineers and PG students can also use this book as a ready reference.

#### KEY FEATURES

- The chapter on Device Fabrication Technology enables easy visualization of device components and semiconductor device modelling.
- Numerous worked-out examples highlight the need for intelligent approximation to achieve more accuracy in less time.
- “HELP DESK” sections throughout the book contain questions (and their solutions) that reflect common doubts a beginner encounters.

**CONTENTS:** Preface. Acknowledgements. Semiconductors. Integrated Circuits Fabrication Technology. Charge Transport in Semiconductors. p-n Junctions. Applications of p-n Junctions. Bipolar Junction Transistors. Advanced Topics in BJT. Thyristors. Junction Field Effect Transistor and Metal-Semiconductor Field Effect Transistor. MOSFETs. Advanced Topics in MOSFETs. Appendices— I: Crystal Structure of Silicon. II: Properties of Some Important Semiconductors at 300 K. III: Properties of Some Important Dielectric Materials at 300 K. IV: Values of Some Physical Constants. V: List of Symbols. Index.

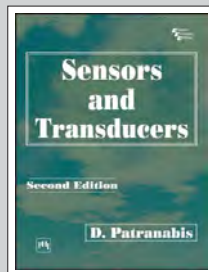
**Latest Print 2013 / 344 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-2398-8 / ₹ 295.00**



## ENGINEERING

### Electrical/Electronics (INSTRUMENTATION)

#### Sensors and Transducers, 2nd ed.



**D. PATRANABIS**, *Professor Emeritus, Heritage Institute of Technology, Kolkata.*

This text is a lucid presentation of the principles of working of all types of sensors and transducers which form the prime components of the instrumentation systems. The characteristics of the sensors and transducers and the operating principles of transducer technologies have been discussed in considerable detail. Besides covering conventional sensors such as electro-mechanical, thermal, magnetic, radiation, and electro-analytical, the recent advances in sensor technologies including smart and intelligent sensors used in automated systems are also comprehensively described. The application aspects of sensors used in several fields such as automobiles, manufacturing, medical, and environment are fully illustrated.

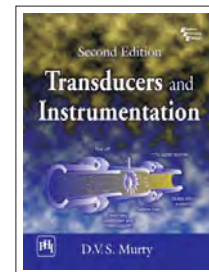
With a straightforward approach the text is aimed at building a sound understanding of the fundamentals, and inculcating analytical skills needed for design and operation. Numerous schematic representations, examples, and review questions help transcend underlying basics to automation and instrumentation. The book with incisive explanations and all the pedagogic attributes is designed to serve the needs of the engineering students of instrumentation, chemical, mechanical, and electrical disciplines. It will also be a useful text for the students of applied sciences.

**CONTENTS:** Preface. Getting Started! Mechanical and Electromechanical Sensors. Thermal Sensors. Magnetic Sensors. Radiation Sensors. Electroanalytical Sensors. Smart Sensors. Recent Trends in Sensor Technologies. Sensors—Their Applications. Review Questions. Bibliography. Index.



Latest Print 2013 / 344 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2198-4 / ₹ 275.00

#### Transducers and Instrumentation, 2nd ed.



**D.V.S. MURTY**, *formerly Professor of Electrical Engineering, Indian Institute of Technology Kharagpur.*

This well-received and widely adopted text, now in its Second Edition, continues to provide an in-depth analysis of the fundamental principles of Transducers and Instrumentation in a highly accessible style. Professor D.V.S. Murty, who has pioneered the cause of development of Instrumentation Engineering in various engineering institutes and universities across the country, compresses his long and rich experience into this volume. He gives a masterly analysis of the principles and characteristics of transducers, common types of industrial sensors and transducers. Besides, he provides a detailed discussion on such topics as signal processing, data display, transmission and telemetry systems, all the while focusing on the latest developments. The text is profusely illustrated with examples and clear-cut diagrams that enhance its value.

#### NEW TO THIS EDITION

To meet the latest syllabi requirements of various universities, three new chapters have been added:

CHAPTER 12: Developments in Sensor Technology

CHAPTER 13: Sophistication in Instrumentation

CHAPTER 14: Process Control Instrumentation

Primarily intended as a text for the students pursuing Instrumentation and Control Engineering, this book would also be extremely useful to professional engineers and those working in R&D organisations.

**CONTENTS:** Preface. Preface to the First Edition. Measurement, Instrumentation and Calibration. Signals and Their Representation. Electrical Measuring Systems. Dynamics of Instrument Systems. Mechanical Transducers. Passive Electrical Transducers. Active Electrical Transducers. Feedback Transducer Systems. Signal Processing Circuits. Data Display and Recording Systems. Data Transmission and Telemetry. Developments in Sensor Technology. Sophistication in Instrumentation. Process Control Instrumentation. Appendix 1: Some Physical Constants. Appendix 2: Some Commonly Used Physical Quantities in SI and FPS Units. Numerical Problems. Index.

Latest Print 2013 / 744 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3569-1 / ₹ 395.00

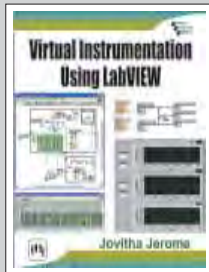


## ENGINEERING

### Electrical/Electronics (INSTRUMENTATION)

#### Virtual Instrumentation Using LabVIEW

**JOVITHA JEROME**, *Professor and Head, Department of Instrumentation and Control Systems Engineering, PSG College of Technology, Coimbatore.*



This book provides a practical and accessible understanding of the fundamental principles of virtual instrumentation. It explains how to acquire, analyze and present data using LabVIEW (Laboratory Virtual Instrument Engineering Workbench) as the application development environment.

The book introduces the students to the graphical system design model and its different phases of functionality such as design, prototyping and deployment. It explains the basic concepts of graphical programming and highlights the features and techniques used in LabVIEW to create Virtual Instruments (VIs). Using the technique of modular programming, the book teaches how to make a VI as a subVI. Arrays, clusters, structures and strings in LabVIEW are covered in detail. The book also includes coverage of emerging graphical system design technologies for real-world applications. In addition, extensive discussions on data acquisition, image acquisition, motion control and LabVIEW tools are presented.

This book is designed for undergraduate and postgraduate students of instrumentation and control engineering, electronics and instrumentation engineering, electrical and electronics engineering, electronics and communication engineering, and computer science and engineering. It will be also useful to engineering students of other disciplines where courses in virtual instrumentation are offered.

The book includes a companion DVD which contains:

- 30-day Evaluation Software of LabVIEW
- Demonstration of projects accomplished by engineering students using LabVIEW
- LabVIEW PowerPoint presentations
- Reference material on Virtual Instrumentation and LabVIEW

**CONTENTS:** Foreword. Preface. Graphical System Design. Introduction to LabVIEW. Modular Programming. Repetition and Loops. Arrays. Clusters. Plotting Data. Structures. Strings and File I/O. Instrument Control. Data Acquisition. IMAQ Vision. Motion Control. LabVIEW Tools and GSD Applications. Index.

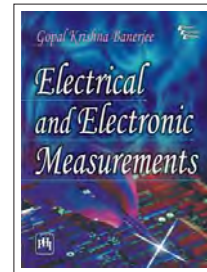


Latest Print 2013 / 416 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4030-5 / ₹ 395.00

### Electrical/Electronics (INSTRUMENTATION & MEASUREMENTS)

#### Electrical and Electronic Measurements

**GOPAL KRISHNA BANERJEE**, *former Professor in the Department of Electrical Engineering, College of Technology, G.B. Pant University of Agriculture and Technology, Pantnagar; Uttarakhand.*



In this modern scientific world a thorough understanding of complex measurements and instruments is the need of the hour. This book provides a comprehensive coverage of the concepts and principles of measurements and instrumentation, and brings into focus the recent and significant developments in this field.

The book presents an exhaustive exposition of different types of measuring instruments and their applications in an easy-to-grasp manner. It presents even the minute details of various measurement techniques and calibration methods, which are the essential features of a measurement programme. The book elaborates on the theoretical background and practical knowledge of different measuring instruments to make the students accustomed to these devices. An in-depth coverage of topics makes the text useful to somewhat more advanced courses and its elaborated methodology will help students meet the challenges in their career.

This book is ideally suitable for undergraduate students (BE/B.Tech.) of Electrical, Electronics and Instrumentation and Control disciplines of engineering. It can be also used as reference book for the cable testing, testing of instruments transformers, testing of energy meters and measurement of physical variables.

#### KEY FEATURES

- Gives a number of chapter-end review questions and numerical problems for practice.
- Includes plenty of diagrams to clarify the concepts.
- Contains about 250 problems and 200 solved examples for the benefit of the students.

**CONTENTS:** Preface. Electrical Units, Dimensions and Standards. Measurement Errors and Statistical Analysis. Measuring Instruments and Accessories. Analog Ammeters and Voltmeters. Extension of Instrument Range. Measurement of Resistance. Testing of Cables. Potentiometers. Measurement of Power and Wattmeters. Measurement of Energy. A.C. Bridges. Magnetic Measurement. High Voltage Measurement. Complex Waveforms and Wave Analyzers. Oscilloscopes. Digital Instruments. Measurement of Non-Electrical Quantities. Signal Conditioners. Data Acquisition and Conversion. Display Devices and Recorders. Data Transmission and Telemetry. Microprocessor based Measurements. Bibliography. Index.

Latest Print 2012 / 872 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4526-3 / ₹ 575.00

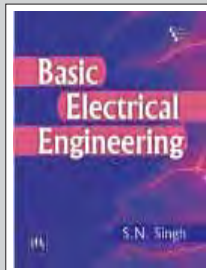


## ENGINEERING

### Electrical/Electronics (INTRODUCTORY/BASIC COURSE)

#### Basic Electrical Engineering

**S.N. SINGH**, *Professor in the Department of Electrical Engineering, IIT Kanpur.*



This book presents comprehensive coverage of all the basic concepts in electrical engineering. It is designed for undergraduate students of almost all branches of engineering for an introductory course in essentials of electrical engineering.

This book explains in detail the properties of different electric circuit elements, such as resistors, inductors and capacitors. The fundamental concepts of dc circuit laws, such as Kirchhoff's current and voltage laws, and various network theorems, such as Thevenin's theorem, Norton's theorem, superposition theorem, maximum power transfer theorem, reciprocity theorem and Millman's theorem are thoroughly discussed. The book also presents the analysis of ac circuits, and discusses transient analysis due to switch operations in ac and dc circuits as well as analysis of three-phase circuits. It describes series and parallel *RLC* circuits, magnetic circuits, and the working principle of different kinds of transformers. In addition, the book explains the principle of energy conversion, the operating characteristics of dc machines, three-phase induction machines and synchronous machines as well as single-phase motors. Finally, the book includes a discussion on technologies of electric power generation along with the different types of energy sources.

#### KEY FEATURES

- Includes numerous solved examples and illustrations for sound conceptual understanding.
- Provides well-graded chapter-end problems to develop the problem-solving capability of the students.
- Supplemented with three appendices addressing matrix algebra, trigonometric identities and Laplace transforms of commonly used functions to help students understand the mathematical concepts required for the study of electrical engineering.

**CONTENTS:** Preface. Introduction. Circuit Elements. Analysis of DC Circuits. Steady-State Analysis of AC Circuits. Transient Analysis of AC/DC Circuits. Electrical Measuring Instruments and Measurements. Three-Phase AC Circuits. Resonance. Magnetic Circuit. Transformers. Electromechanical Energy Conversion. Direct-Current Machines. Three-Phase Induction Machines. Three-Phase Synchronous Machines. Fractional kW (Horse-Power) Motors. Electric Power Generation Technologies. Appendices. Bibliography. Index.

Latest Print 2013 / 460 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4188-3 / ` 325.00

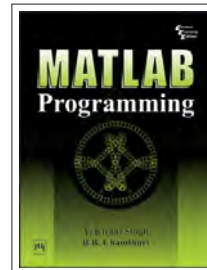


PHI Learning: Publications

#### MATLAB Programming

**Y. KIRANI SINGH**, *Project Engineer at the Centre for Development of Advanced Computing (CDAC), Kolkata.*

**B.B. CHAUDHURI**,  
*Professor and Head, Computer Vision and Pattern Recognition Unit, Indian Statistical Institute Kolkata.*



MATLAB is a very powerful, high-level technical computing language used by mathematicians, scientists and engineers to solve problems in a wide range of application areas. It also comes with several toolboxes to solve most common problems.

The book introduces MATLAB programming in simple language with numerous examples that help clarify the concepts. It is designed to enable readers develop a strong working knowledge of MATLAB and acquire programming skills to write efficient programs. The book is suitable for undergraduate and postgraduate engineering students, researchers and professionals who wish to learn this language quickly and more conveniently. The readers after going through this book will be able to write their own programs to solve scientific and engineering problems of varying complexity.

#### KEY FEATURES

- Use of system commands and problem-solving techniques in command windows is explained in simple and clear language.
- Handling of arrays and matrices, which are the main entities in MATLAB environment, is discussed extensively in separate chapters.
- Handling of cell arrays and structures is described clearly with examples.
- Techniques of developing new MATLAB programs using scripts and functions are explained in a systematic way.
- File-handling techniques are also demonstrated.
- Topics of two-dimensional graphics are discussed with illustrative plots.
- GUI programming is introduced in an easily understandable way.

**CONTENTS:** Preface. Introduction. Common system Commands and Mathematical Operators. Handling of Arrays. Handling of Matrices. Strings, Time and Date. Cell Arrays and Structures. Programming in MATLAB, M-File Scripts. 8. Programming in MATLAB, M-File Functions. File I/O Handling in MATLAB. Two-Dimensional Plots. Graphical User Interface. Bibliography. Index.

Latest Print 2012 / 388 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3081-8 / ` 275.00

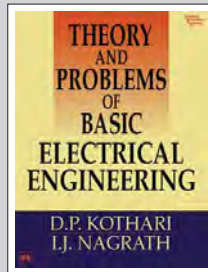


## ENGINEERING

**Electrical/Electronics** (INTRODUCTORY/BASIC COURSE)

**Electrical/Electronics** (MICROELECTRONICS/VLSI)

### Theory and Problems of Basic Electrical Engineering



**D.P. KOTHARI**, *Director General of Vindhya Group of Institutions, Indore.*

**I.J. NAGRATH**, *Formerly, Professor of Electrical and Electronics Engineering and Deputy Director, Birla Institute of Technology and Science, Pilani.*

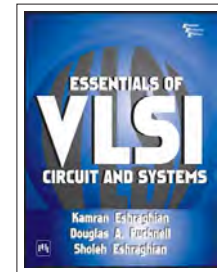
This is a comprehensive and authoritative introductory textbook for a first course in basic electrical engineering that caters to undergraduate students of not only electrical engineering but also other engineering disciplines such as electronics, computer, mechanical, civil and chemical. The text provides an indepth coverage of three major areas of electrical engineering: electrical circuit analysis, electric machines, and measurement and instrumentation.

The basic concepts and the related techniques are covered in a lucid manner to provide a thorough grounding through a series of carefully crafted solved examples and problems, supplementary problems, multiple choice (objective type) questions and review questions. All these questions provide a sound and unified understanding of concepts through comprehensive drill in problem solving and help the reader to grasp the subject fully.

**CONTENTS:** Preface. Elementary Concepts and Definitions. Fundamentals of Resistive Circuits. Fundamentals of Reactive Circuits. Sinusoidal Steady State Analysis of Circuits. Frequency Response, Resonance, Fourier Analysis and Two-port Networks. Three-phase Circuits. Circuit Analysis by Laplace Transformation. Magnetic Circuits and Induction, Coupled Circuits and EMEC. Transformers. EMF and Torque in Electric Machines. DC Machines. Synchronous Machines. Induction Machines. Measurement Techniques and Instrumentation. Electric and Electronic Instrumentation and Measurement. Suggested Further Reading. Index.

**Latest Print 2013 / 520 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-1263-0 / ` 350.00**

### Essentials of VLSI Circuits and Systems



**KAMRAN ESHRAGHIAN**,  
**DOUGLAS A. PUCKNELL** and  
**SHOLEH ESHRAGHIAN**

The progress made in microelectronics and photon-based sciences, coupled with the emergence of nanotechnology, is enabling development of novel VLSI circuits and systems with extraordinary new properties relevant to nearly every sector of the economy.

In this new book, the authors (the first two are senior, established authors) use their pedagogical skills and professional expertise to present the fundamentals of silicon-based VLSI design topics as the enabler of future systems. The book offers comprehensive coverage of the essential matters for the design of digital circuits in nMOS, CMOS and BiCMOS technologies. It is an accessible and well-structured textbook that provides insights into concepts and illustrates, through numerous examples, links between circuits, logic, and system design.

The material covered in this book is classroom tested by the authors over a number of years. It covers essentials of VLSI design in a style that makes for easy reading by students and prepares them to embark upon challenging design takes ahead.

**CONTENTS:** List of Color Plates. Preface. Acknowledgements. About the Authors. A Review of Microelectronics and An Introduction to MOS Technology. Basic Electrical Properties of MOS and BiCMOS Circuits. MOS and BiCMOS Circuit Design Processes. Basic Circuit Concepts. Scaling of MOS Circuits. Subsystem Design and Layout. Subsystem Design Processes. Illustration of the Design Process—Computational Elements. Memory, Registers, and Aspects of System Timing. Practical Aspects and Testability. Some CMOS Design Projects. From Algorithms to Layout—Designers' Thought Process. Scalable Multiplication. Appendices—A. 2.0 Micron Double Poly. Double Metal n-well CMOS—Electrical Parameters. B. 1.2 Micron Single Poly. Double Metal n-well and p-well CMOS—Design Rules and Process and Device Specifications. C. The Programmable Logic Array (PLA). Further Reading. Index.

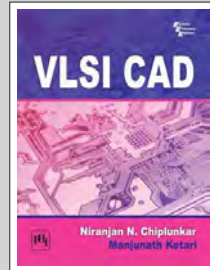
**Latest Print 2012 / 512 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-2772-6 / ` 425.00**



## ENGINEERING

### Electrical/Electronics (MICROELECTRONICS/VLSI)

#### VLSI CAD



**NIRANJAN N. CHIPLUNKAR**, *Vice Principal, Dean (Academics), and Head of the Department of Computer Science and Engineering at NMAM Institute of Technology, Nitte, Karnataka.*

**MANJUNATH KOTARI**, *Assistant Professor, Department of Computer Science and Engineering, NMAM Institute of Technology, Nitte, Karnataka.*

This well-organised book presents the basics of VLSI along with important algorithms used by CAD tool designers. It discusses general VLSI design styles, layout design rules, technology mapping in FPGAs and 3D-FPGAs. In addition, the text describes three important steps in high level synthesis of VLSI, namely, partitioning, scheduling, and data path allocation, besides logic synthesis which determines the gate level structure of circuits. Finally, the book gives a detailed account of physical synthesis, where steps such as floorplanning, placement, routing and compaction are explained with necessary algorithms.

This book is intended as a text for the undergraduate and postgraduate students of engineering—Electrical and Electronics Engineering/Electronics and Communication Engineering/Computer Science and Engineering, besides Instrumentation for their course on VLSI CAD. In addition, the book would also be extremely useful for professionals in this field.

#### KEY FEATURES

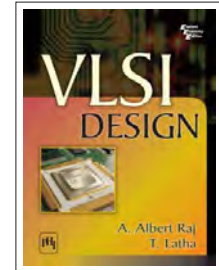
- Presents a variety of chip design tools.
- Includes a fairly large number of algorithms.
- Discusses VHDL and graph theory essential for VLSI CAD tool design.
- Provides 100 questions selected from various university examination papers.

**CONTENTS:** Preface. Basic VLSI Design. CAD for VLSI. Partitioning in High level Synthesis. Scheduling in High level Synthesis. Data Path Allocation in High Level Synthesis. Logic Synthesis. Physical Synthesis. Appendices. Bibliography. Index

Latest Print 2011 / 200 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4286-6 / ₹ 175.00



#### VLSI Design



**A. ALBERT RAJ**, *Assistant Professor and Head, Department of Electronics and Instrumentation Engineering, Noorul Islam College of Engineering, Kanyakumari, Tamil Nadu.*

**T. LATHA**, *Assistant Professor, Department of Electronics and Instrumentation Engineering, Noorul Islam College of Engineering, Kanyakumari.*

This text is intended for the undergraduate engineering students in Electrical and Electronics Engineering, Electronics and Communication Engineering, and Electronics and Instrumentation Engineering, and those pursuing post-graduate courses in Applied Electronics and VLSI Design.

With the electronic devices and chips becoming smaller and smaller, the sizes of circuits and transistors on the microchips are approaching atomic levels. And so, Very Large-Scale Integration (VLSI) Design refers to the process of placing hundreds of thousands of electronic components on a single chip which nearly all modern computer architectures employ, and this technology has assumed a significant role in today's tech savvy world.

This well-organized, up-to-date and compact text explains the basic concepts of MOS technology including the fabrication methods, MOS characteristic behaviour, and design processes for layouts, etc. in a crisp and easy-to-learn style. The latest and most advanced techniques for maximising performance, minimising power consumption, and achieving rapid design turnarounds are discussed with great skill by the authors.

#### KEY FEATURES

- Offers an insight into the CMOS testing techniques for the design of VLSI circuits.
- Gives a number of solved problems in VHDL and Verilog languages.
- Provides a number of short answer questions to help the students during examinations.

**CONTENTS:** Preface. Introduction. Basic MOS Structure. MOS Device Characteristics. CMOS Inverter Design. MOS Circuit Design Processes. Special Circuit Layouts. Super Buffers, BiCMOS and Steering Logic. CMOS Combinational Logic Circuits. CMOS Sequential Logic Circuits. Design of Arithmetic Building Blocks. Programmable Logic Devices. CMOS Chip Design. Routing Procedures. CMOS Testing. Verilog HDL. Behavioural Modelling. Arithmetic Circuits in CMOS VLSI. VHDL. Index.

Latest Print 2014 / 472 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3431-1 / ₹ 350.00



## ENGINEERING

### Electrical/Electronics (MICROPROCESSORS AND MICROCONTROLLERS)

#### 0000 to 8085: Introduction to Microprocessors for Engineers and Scientists, 2nd ed.



**P.K. GHOSH**, former Professor at the Indian Institute of Technology Kanpur.

**P.R. SRIDHAR**, Electronics Engineer, Indian Institute of Technology Kanpur.

The 8085 processor and its peripherals have been used to explain the basic concepts of microprocessor operation and system realization. This text can be used by electrical engineering undergraduates in their first course on microprocessors, and by engineering students in several other disciplines, and also by students of science with some preparation in digital electronics.

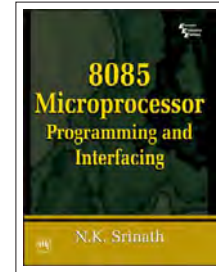
#### KEY FEATURES

- The peripheral devices are discussed comprehensively.
- The text gives design principles along with complete circuit and printed circuit board details of a stand-alone microcomputer. This also serves as an outstanding illustration of practical realization of microprocessor-based systems.
- The text has been successfully tested in the classroom and also in workshops on microprocessor systems.
- In the present edition, a sample set of monitor routines has been given, the number of problems has been substantially increased, and *full solutions* to the extended problem set have been provided.

**CONTENTS:** Preface. Preface to the Second Edition. The Generic Microcomputer. The Architecture of a Microprocessor. The 8085A CPU. The 8085A Instruction Set. Memory and Input/Output Addressing. 8085A Minimum System Configuration. EPROM and RAM Memories: 2764 and 6264. Programmable Keyboard/Display Interface: 8279. Programmable Interval Timer: 8253. Programmable Peripheral Interface: 8255. Serial Communication and the USART 8251. Programmable DMA Controller: 8257. Programmable Interrupt Controller: 8259. Appendices—A: A Summary of Basic Digital Circuits. B: Some Assembly Language Programs. C: Design Principles and Full Circuit Description of the Micro-computer CASE 3.1. D: 8085A Instruction Set Tables. Problems. Solutions to the Problems. Index.

**Latest Print 2013 / 328 pp. / 21.6 × 27.8 cm**  
**ISBN-978-81-203-0978-4 / ₹ 350.00**

#### 8085 Microprocessor: Programming and Interfacing



**N.K. SRINATH**, Professor and Head, Department of Information Science and Engineering, R.V. College of Engineering, Bangalore.

This up-to-date and contemporary book is designed as a first level undergraduate text on microprocessors for the students of engineering (computer science, electrical, electronics, telecommunication, instrumentation), computer applications and information technology. It gives a clear exposition of the architecture, programming and interfacing and applications of 8085 microprocessor. Besides, it provides a brief introduction to 8086 and 8088 Intel microprocessors.

#### THE BOOK FOCUSES ON:

- microprocessors starting from 4004 to 80586.
- instruction set of 8085 microprocessor giving the clear picture of the operations at the machine level.
- the various steps of the assembly language program development cycle.
- the hardware architecture of microcomputer built with the 8085 microprocessor.
- the role of the hardware interfaces: memory, input/output and interrupt, in relation to overall micro-computer system operation.
- peripheral chips such as 8255, 8253, 8259, 8257 and 8279 to interface with 8085 microprocessor and to program it for different applications.

**CONTENTS:** Foreword. Preface. Acknowledgements. Introduction to Microprocessors. 8085 Microprocessor. Instruction Set [Intel 8085]. Fundamentals of Programming. Semiconductor Memory. Input/Output Interface. Programmable Peripheral Interface 8255A. Programmable Internal Timer 8253. Programmable Interrupt Controller 8259A. Programmable DMA Controller 8257. Serial Data Transfer. Programmable Keyboard/Display Interface (8279). 8086 Microprocessor Architecture. 8086 Pin-Configuration. Appendix. Index.

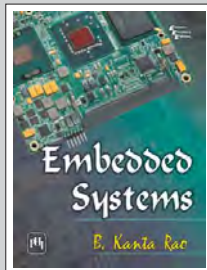
**Latest Print 2014 / 348 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-2785-6 / ₹ 295.00**



## ENGINEERING

### Electrical/Electronics (MICROPROCESSORS AND MICROCONTROLLERS)

#### Embedded Systems



**B. KANTA RAO**, Senior Professor, Department of Computer Science and Engineering, Gayatri College of Engineering, Visakhapatnam.

Designed as a textbook for the undergraduate students of electronics and communication engineering, electronics and instrumentation engineering, computer science and engineering, information communication technology as well as for the postgraduate students of computer applications (MCA), it lays the foundation for all readers on all possible applications of embedded processors.

This text deals with some of the interesting processors that will enlighten the need for new instructions and fast program implementation. The processors covered are the classic 8051 family, ATmega family, PIC family and Texas 430 family along with a good introduction to ARM processors.

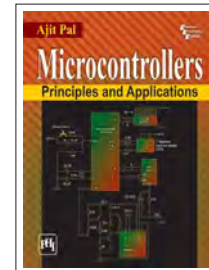
#### KEY FEATURES

- Well designed hardware–software integrated programs and exercises
- Examples for each processor instruction set
- Extensive discussion on classic 8051 family including all recent developments

**CONTENTS:** Preface. Embedded Processor Architectures: An Overview. Intel 8051 Architecture (Classic Version). Programming. Communication Interfaces. Timers and Counters. Analog Subsystems in Embedded Processors. Advanced Research Microprocessor (ARM) Architecture. Advanced Embedded Systems: ATmega Processors. Microchip PIC Embedded Processor Family. Integrated Development Environment: Assembler and Simulation. Introduction to Real Time Systems. Appendices. Index.

 Latest Print 2013 / 560 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4081-7 / ₹ 425.00

#### Microcontrollers: Principles and Applications



**AJIT PAL**, Professor in the Department of Computer Science and Engineering at Indian Institute of Technology Kharagpur.

This book gives a comprehensive coverage of different aspects of microcontroller-based system design and development in a generalized manner. Basic ideas and fundamental concepts common to all microcontrollers have been introduced before giving specific examples using the 8051 microcontroller, which is the most popular microcontroller in use today. Coverage of the three important issues such as hardware, software and hardware–software integration has been provided in a balanced manner. For easy understanding of the subject, a bottom-up approach has been followed.

The book is designed for the undergraduate students of electrical engineering, computer science and engineering, and electronics and communication engineering.

#### KEY FEATURES

- Provides many pedagogical features such as learning objectives, introduction, examples, summary, fill in the blanks and chapter-end exercises to assist teaching and learning.
- Pays special attention to the interfacing of I/O devices for human interaction, and I/O devices for process control and instrumentation, which are important in the context of embedded systems.
- Gives comprehensive information about development aids and troubleshooting techniques for the development of microcontroller-based systems.
- Includes a number of real-life application examples, with complete details of hardware and software implementation, after fabricating prototype models in the laboratory.

**CONTENTS:** Preface. Introduction. Architecture of the Intel 8051. Instruction Set: Vocabulary of the Machine. Assembly Language Programming. Interfacing External Memory. Data Transfer Techniques and I/O Ports. Interfacing for Human Interaction. Interfacing of Transducers, Sensors and Actuators. Timer/Counter Operations. Serial Mode of Data Transfer. System Development and Development Aids. Application Examples. Index.

Latest Print 2014 / 392 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4392-4 / ₹ 350.00

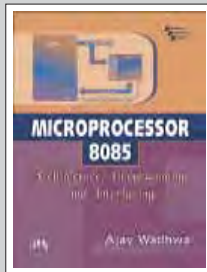




## ENGINEERING

### Electrical/Electronics (MICROPROCESSORS AND MICROCONTROLLERS)

#### Microprocessor 8085: Architecture, Programming, and Interfacing



**AJAY WADHWA**, Associate Professor, Department of Physics, SGTB Khalsa College, University of Delhi.

This book is designed as a first-level introduction to Microprocessor 8085, covering its architecture, programming, and interfacing aspects. Microprocessor 8085 is the basic processor from which machine language programming can be learnt. The text offers a comprehensive treatment of microprocessor's hardware and software.

#### DISTINGUISHING FEATURES

- All the instructions of 8085 processor are explained with the help of examples and diagrams.
- Instructions have been classified into groups and their mnemonic hex codes have been derived.
- Memory maps of different memory sizes have been illustrated with examples.
- Timing diagrams of various instructions have been illustrated with examples.
- A large number of laboratory-tested programming examples and exercises are provided in each chapter.
- At the end of each chapter, numerous questions and problems have been given.
- Problems from previous years' question papers have been separately given in each chapter.
- More than 200 examples and problems have been covered in the entire text.

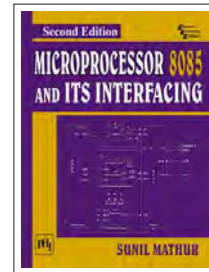
This book is designed for undergraduate courses in B.Sc. (Hons) Physics and B.Sc. (Hons) Electronics. It will also be useful for the students pursuing B.Tech. degree/diploma in electrical and electronics engineering.

**CONTENTS:** Preface. Basic Computer Design. Microprocessor 8085 Architecture. Assembly Language Programming. Memory. Microprocessor—Timing and Control. Interfacing. Appendices. Index.



Latest Print 2012 / 172 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-4013-8 / ₹ 150.00

#### Microprocessor 8085 and its Interfacing, 2nd ed.



**SUNIL MATHUR**, Assistant Professor, Department of Electronics and Communication Engineering, Maharaja Agrasen Institute of Technology, Guru Gobind Singh Indraprastha University, Delhi.

This comprehensive and thoroughly updated text now in its second edition continues to provide the complete knowledge about the Intel's 8085 microprocessors, its programming and concept of interfacing of memory, Input/output devices and programmable peripheral chips.

Organized in four parts, Part I (Chapters 1–9) covers a review of the analog and digital signals as well as hardware and software related aspects of microprocessor 8085. Part II (Chapters 10 and 11) discusses memory and input-output concepts, analog to digital and digital to analog converters and various memory and IO address decoding techniques. Part III (Chapters 12–17) explains the programmable interfacing chips with extensive interfacing examples. Part IV (Chapters 18 and 19) presents a brief discussion on other 8-bit microprocessors along with 16 and 32-bit Intel Processors. Each topic has been supported with numerous examples that will help students apply the concepts to other microprocessors in the course at advanced level.

This book is designed specifically for the undergraduate students of electronics and communication engineering, computer science and engineering, and information technology.

#### NEW TO THIS EDITION

- Chapters on "Architecture and Organization of Microprocessor" and "Instruction Set of 8085 Microprocessor" have been revised and modified substantially.
- Multiple choice questions have been added to all the chapters.

**CONTENTS:** Preface. Preface to the First Edition. Acknowledgements. PART—I: Number System. Architecture and Organization of Microcomputer. Architecture and Organization of Microprocessor. Instruction Set of 8085 Microprocessor. Instruction Timing and Operation of 8085 Microprocessor. Programming of 8085 Microprocessor. Stack and Subroutine. Interrupts of 8085. Serial and Parallel Data Transfer. PART—II: IO and Memory Interfacing. Digital–Analog Conversion. PART—III: Non-Programmable and Programmable Peripheral Interfacing Chips. 8253/54 Programmable Timer. DMA Controller 8257 and 8237. 8259A, Programmable Interrupt Controller (PIC). Keyboard and Display Interfacing. 8251 Universal Synchronous Asynchronous Receiver Transmitter (USART). PART—IV: Other 8-Bit Microprocessors. Advance Microprocessors. Index.

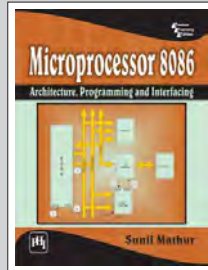
Latest Print 2013 / 704 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4390-0 / ₹ 450.00



## ENGINEERING

### Electrical/Electronics (MICROPROCESSORS AND MICROCONTROLLERS)

#### Microprocessor 8086: Architecture, Programming and Interfacing



**SUNIL MATHUR** is Assistant Professor, Department of Electronics and Communication Engineering, Maharaja Agrasen Institute of Technology, Guru Gobind Singh Indraprastha University, Delhi.

Primarily intended for the undergraduate students of electronics and communication engineering, computer science and engineering, and information technology, this book skilfully integrates both the hardware and software aspects of the 8086 microprocessor. It offers the students an up-to-date account of the state-of-the-art microprocessors and therefore can be regarded as an incomparable source of information on recently developed microprocessor chips. The book covers the advanced microprocessor architecture of the Intel microprocessor family, from 8086 to Pentium 4.

The text is organized in four parts. Part I (Chapters 1–7) includes a detailed description of the architecture, organization, instruction set, and assembler directives of microprocessor 8086. Part II (Chapters 8–11) discusses the math coprocessor, multiprocessing and multiprogramming, the different types of data transfer schemes, and memory concepts. Part III (Chapters 12–15) covers programmable interfacing chips with the help of extensive interfacing examples. Part IV (Chapters 16–18) deals with advanced processors—from 80186 to Pentium 4.

This well-organized and student-friendly text should prove to be an invaluable asset to the students as well as the practising engineers.

#### KEY FEATURES

- Gives elaborate programming examples to develop the analytical ability of students.
- Provides solved examples covering different types of typical interfacing problems to develop the practical skills of students.
- Furnishes chapter-end exercises to reinforce the understanding of the subject.

**CONTENTS:** Preface. Acknowledgements. Architecture and Organization of Microprocessors and Microcomputers. Introduction to 8086. 8086 Based System. Instructions Set of 8086. Assembler Directives. Programming of 8086. Interrupts of 8086. Math Coprocessor 8087. Multiprocessing and Multiprogramming. Serial and Parallel Data Transfer. IO and Memory Interfacing. Programmable Peripheral Interfacing Chips. 8253/54 Programmable Timer. DMA Controller 8257 and 8237. Keyboard and Display Interfacing. 80186 and 80286 Microprocessors. Intel's 32-bit Microprocessors. Today's Processor's. Index.



Latest Print 2012 / 688 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4087-9 / ₹ 450.00

PHI Learning: Publications

#### Microprocessors and Microcontrollers: Architecture, Programming and System Design 8085, 8086, 8051, 8096, 2nd ed.



**KRISHNA KANT**, Dean (Academic) at Jaypee Institute of Information Technology, Noida.

This book provides the students with a solid foundation in the technology of microprocessors and microcontrollers, their principles and applications. It comprehensively presents the material necessary for understanding the internal architecture as well as system design aspects of Intel's legendary 8085 and 8086 microprocessors and Intel's 8051 and 8096 microcontrollers.

The book throughout maintains an appropriate balance between the basic concepts and the skill sets needed for system design. Besides, the book lucidly explains the hardware architecture, the instruction set and programming, support chips, peripheral interfacing, and cites several relevant examples to help the readers develop a complete understanding of industrial application projects. Several system design case studies are included to reinforce the concepts discussed.

With exhaustive coverage and practical approach, the book would be indispensable to undergraduate students of Electrical and Electronics, Electronics and Communication, and Electronics and Instrumentation Engineering. It can be used for a variety of courses in Microprocessors, Microcontrollers, and Embedded System Design.

The second edition of the book introduces additional topics like I/O interfacing and programming, serial interface programming, delay programming using 8086 and 8051. Besides, many more examples and case studies have been added.

**CONTENTS:** Preface. Preface to the First Edition. Acknowledgements. System Design Using Microprocessor. What a Microprocessor Is. Intel 8085 Microprocessor—Hardware Architecture. Intel 8085 Microprocessor—Instruction Set and Programming. Intel 8086—Hardware Architecture. Intel 8086 Microprocessor—Instruction Set and Programming. Microprocessor—Peripheral Interfacing. System Design Using Intel 8085 and Intel 8086 Microprocessors—Case Studies. Intel 8051 Microcontroller—Hardware Architecture. Intel 8051 Microcontroller—Instruction Set and Programming. The 8051 Microcontroller-Based System Design—Case Studies. Intel 8096 Microcontroller—Hardware Architecture. Intel 8096 Microcontroller—Instruction Set and Programming. The 8096 Microcontroller-Based System Design—Case Studies. Appendices. Index.

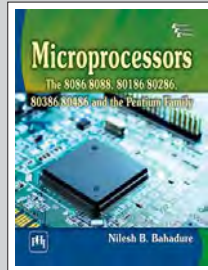
Latest Print 2014 / 876 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4853-0 / ₹ 495.00



## ENGINEERING

### Electrical/Electronics (MICROPROCESSORS AND MICROCONTROLLERS)

#### Microprocessors: The 8086/8088, 80186/80286, 80386/80486 and the Pentium Family



**NILESH B. BAHADURE**, Reader in the Department of Electronics and Telecommunication Engineering at the Bhilai Institute of Technology, Durg.

This comprehensive text provides a thorough understanding of the principles and applications of microprocessors. It explains the architectures, assembly language programming, interfacing, and applications of Intel's 8086/8088 microprocessors, 8087 math coprocessor, and 8255, 8253, 8251, 8259, 8279 and 8237 peripherals. Besides, the book also covers Intel's 80186/80286, 80386/80486, and the Pentium family microprocessors.

The book throughout maintains an appropriate balance between the basic concepts and the skill sets needed for system design. A large number of solved examples on assembly language programming and interfacing are provided to help the students gain mastery of the topics discussed.

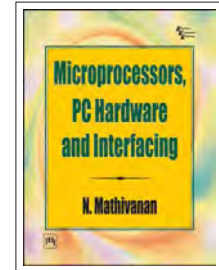
The book is eminently suitable for undergraduate engineering students of Electronics, Electronics and Communication, Electronics and Instrumentation, Computer Science and Engineering, and Information Technology.

**CONTENTS:** Preface. Introduction. Architecture and Functional Block Diagram of Microprocessor 8086. Instruction Sets and Programming of Microprocessor 8086. Assembly Language Programming of Microprocessor 8086. Interrupts of Microprocessor 8086. Interfacing of Memory with Microprocessors 8086 and 8088. Timing Diagram of Microprocessor 8086. Numeric Data Processor 8087. Programmable Peripheral Interface 8255. Programmable Interval Timer 8253/8254. Programmable Interrupt Controller. Universal Synchronous—Asynchronous Receiver Transmitters. Programmable Keyboard Display Interface 8279. Direct Memory Access (DMA) Controller 8257/8237. Other 16 Bits Microprocessors 80186 and 80286. 32 Bits Microprocessors 80386, 80486 and Introduction to Pentium Family. Index.

Latest Print 2014 / 680 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3942-2 / ` 425.00



#### Microprocessors, PC Hardware and Interfacing



**N. MATHIVANAN**, Director, University Science Instrumentation Centre, Madurai Kamraj University, Madurai.

Microprocessor is the most fundamental components in PC systems, and for learning the hardware organization and interfacing techniques, a complete knowledge of 8086 microprocessor is essential. This book thus provides a complete picture of the features and workings of microprocessor. It explains the architecture, instructions, programming, system design, peripheral devices and interfacing.

Beginning with an overview of PC hardware from the original IBM PC to the recent Pentium systems, the book presents the internal architecture and instruction set of 8086 microprocessor and the design of an 8086 based system, and then describes the hardware and software of interfacing techniques to I/O buses and the standard ports in detail, substantiating them with examples and worked out programs in C++ and assembly language. Operations of advanced Intel microprocessors such as 80286, 80386, 80486, Pentium, Pentium Pro, Pentium MMX and Pentium II, and usage of the pins and signals of different types of I/O buses have also been covered in detail.

The book is useful for students of electronics and instrumentation engineering, and courses in communication.

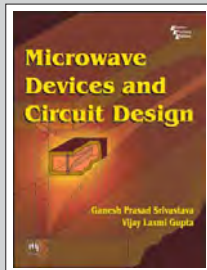
**CONTENTS:** Preface. Hardware Organization of IBM PC. The 8086 Microprocessor. The 8086 Based System Design. Peripheral Interfaces. Advanced Microprocessors. The Motherboard of IBM PC. Drives. Peripherals. Input-Output Buses. Parallel and Serial Ports. Universal Serial Bus. Appendices. Objective-Type Questions. Answers to Select Review Questions. Index.

Latest Print 2012 / 532 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2317-9 / ` 350.00

## ENGINEERING

### Electrical/Electronics (MICROWAVE)

#### Microwave Devices and Circuit Design



**GANESH PRASAD SRIVASTAVA**, Formerly, Professor of Electronics, University of Delhi.

**VIJAY LAXMI GUPTA**, Reader, Department of Electronic Science, University of Delhi.

This textbook presents a unified treatment of theory, analysis and design of microwave devices and circuits. It is designed to address the needs of undergraduate students of electronics and communication engineering for a course in microwave engineering as well as those of the students pursuing M.Sc. courses in electronics science. The main objective is to provide students with a thorough understanding of microwave devices and circuits, and to acquaint them with some of the methods used in circuit analysis and design.

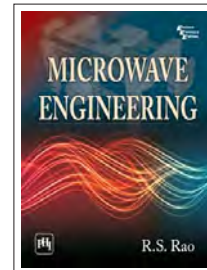
Several types of planar transmission lines such as stripline, microstrip, slot line and a few other structures have been explained. The important concepts of scattering matrix and Smith chart related to design problems have been discussed in detail. The performance and geometry of microwave transistors—both bipolar and field effect—have been analysed. Microwave passive components such as couplers, power dividers, attenuators, phase shifters and circulators have been comprehensively dealt with. Finally, the analysis and design aspects of microwave transistor amplifiers and oscillators are presented using the scattering parameters technique.

Numerous solved problems and chapter-end questions are included for practice and reinforcement of the concepts.

**CONTENTS:** Preface. Introduction. Transmission Lines. Planar Transmission Lines. The Scattering Matrix. Smith Chart and Impedance Matching. Waveguides, Cavities and Resonators. Solid State Microwave Devices. Microwave Components. Microwave Amplifiers and Oscillators. Index.

Latest Print 2013 / 480 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2195-3 / ₹ 425.00

#### Microwave Engineering



**R.S. RAO**, Professor in the Department of Electronics and Communication Engineering at Sree Vidyanikethan Engineering College, Andhra Pradesh.

This book presents the basic principles, characteristics and applications of commonly used microwave devices used in the design of microwave systems.

The book begins with a brief overview of the field of microwave engineering and then provides a thorough review of two prerequisite topics in electromagnetics, that is, electromagnetic field theory and transmission lines, so essential to know before analysing and designing microwave systems.

The book presents the full spectrum of both passive and active microwave components. Hollow pipe waveguides are thoroughly analysed with respect to their field components and other important characteristics such as bandwidth, dispersive nature, various impedances, and attenuation parameters. The basic principles of various types of microwave junctions used for power division, addition, and in measurement systems, such as tees, directional-couplers, circulators, gyrators, etc. are explained, along with their scattering parameters required for the analysis of microwave circuits. The text also presents a comprehensive analytical treatment of microwave tubes in common use, such as klystrons, magnetrons, TWTs, and solid state sources such as Gunn diodes, IMPATT diodes, funnel diodes and PiN diodes, etc.

Finally, the book describes the laboratory procedures for measurements of various parameters of circuits working at microwave frequencies.

The book contains an instructional framework at the end of each chapter composed of questions, problems, and objective type questions to enable students to gain skills in applying the principles and techniques learned in the text.

The book is appropriate for a course in Microwave Engineering at the level of both undergraduate and postgraduate students of Electronics and Communication Engineering.

**CONTENTS:** Preface. Acknowledgements. Microwave Basics. Em Wave Theory. Transmission Line Theory. Hollow Pipe Waveguides. Waveguide Components. Microwave Junction Devices. Microwave Tubes. Solid State Devices. Microwave Measurements. Appendix. Index.

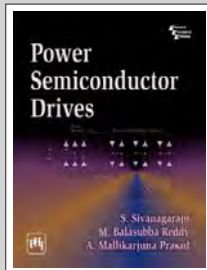
Latest Print 2012 / 512 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4514-0 / ₹ 350.00



## ENGINEERING

### Electrical/Electronics (POWER ELECTRONICS)

#### Power Semiconductor Drives



**S. SIVANAGARAJU**, Associate Professor of Electrical Engineering, University College of Engineering, Jawaharlal Nehru Technological University, Kakinada.

**M. BALASUBBA REDDY**, Associate Professor, Department of Electrical and Electronics Engineering, Prakasam Engineering College, Prakasam.

**A. MALLIKARJUNA PRASAD**, Associate Professor, Department of Electrical and Electronics Engineering, St. John's College of Engineering and Technology, Kurnool.

This textbook introduces students to the underlying principles of operation of power semiconductor drives. It explains every facet of application of power electronics to the control of electric motors in industrial drives. The book is primarily intended for B.E./B.Tech. students of Electrical Engineering/Electrical and Electronics Engineering having courses in Electric Drives/Power Semiconductor Drives. It will also be highly useful for M.E./M.Tech. students of these disciplines specializing in Power Electronics/Industrial Drives/Electric Drives.

The text is divided into eight chapters. The first two chapters cover the control of dc motors by using various kinds of converters. The third chapter focuses on dual converters and various braking techniques. Chopper control fed dc motors are discussed in the fourth chapter. The next three chapters are devoted to control methods for induction motors. The eighth chapter deals with the control of synchronous motor drives fed from VSI converters and cycloconverters.

Extensively illustrated, the book contains numerous solved examples throughout the text as well as a variety of chapter-end questions to help in comprehending as well as in strengthening the grasp of the underlying concepts and principles.

**CONTENTS:** Preface. Acknowledgements. Control of DC Motors by Single-phase Converters. Control of DC Motors by Three-phase Converters. Four Quadrant Operation of DC Drives. Chopper Controlled DC Drives. Stator Voltage Control of Induction Motor Drives. Control of Induction Motor Drives through Stator Frequency. Control of Induction Motor Drives from Rotor Side. Control of Synchronous Motor Drives. Index.

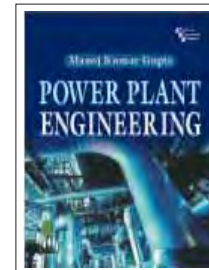
Latest Print 2013 / 392 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3658-2 / ₹ 295.00



### Electrical/Electronics (POWER PLANT ENGINEERING)

#### 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

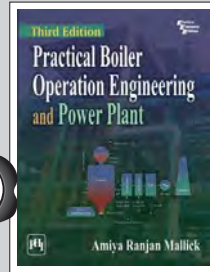
ISBN-978-81-203-4612-3 / ₹ 350.00



## ENGINEERING

### Electrical/Electronics (POWER PLANT ENGINEERING)

#### Practical Boiler Operation Engineering and Power Plant, 3rd ed.



**A.R. MALLICK**, *General Manager (Power Plant), B.K. Birla Group of Industries, Maharashtra.*

The text, now in its third edition, continues to provide the latest technical developments as well as a vast knowledge about the concepts of thermal power generation. Written in a simple text format using a lucid language, the book balances the theoretical and practical aspects of various topics bearing on thermal power plants. The text incorporates step by step procedure to be adopted during normal and emergency situations in a power plant. Some topics like operation of boiler, operation of steam turbine, commissioning of power plant, maintenance of power plant, control and instrumentation, etc. are very much connected to the real life situation.

Besides serving the needs of undergraduate students of power plant engineering and the students of National Power Training Institute (NPTI), this book is equally meant to benefit practicing engineers from the cross functional areas of thermal power plant.

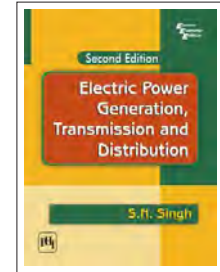
**CONTENTS:** Preface. Preface to the Second Edition. Preface to the Third Edition. Fundamentals. Heat Transfer Methods. Fuel and Combustion. Properties of Steam. Boiler Feedwater Chemistry. Introduction to Boiler. Fuel Handling System. Air Path, Feedwater Path. Steam Path. Flue Gas Path. Ash Handling System. Operation of Boiler. Pipes, Tubes and Fittings. Pipe Fittings and Ancillaries. Steam Turbine. Auxiliary System of Steam Turbine. Operation of Steam Turbine. Generator, Commissioning of Power Plant. Maintenance of Power Plant. Control and Instrumentation. Scope of Energy Conservation in Thermal Power Plant. Power Plant Calculations. Self-test Questions. Appendices—1: Unit Conversion. 2: Various Pipelines Used at Thermal Power Plant. 3: BOE Syllabus. Index.

Latest Print 2014 / 580 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4855-4 / ₹ 650.00



### Electrical/Electronics (POWER SYSTEM)

#### Electric Power Generation, Transmission and Distribution, 2nd ed.



**S.N. SINGH**, *Professor of Electrical Engineering at Indian Institute of Technology Kanpur.*

This accessible text, now in its Second Edition, continues to provide a comprehensive coverage of electric power generation, transmission and distribution, including the operation and management of different systems in these areas. It gives an overview of the basic principles of electrical engineering and load characteristics and provides exhaustive system-level description of several power plants, such as thermal, electric, nuclear and gas power plants. The book fully explores the basic theory and also covers emerging concepts and technologies. The conventional topics of transmission subsystem including HVDC transmission are also discussed, along with an introduction to new technologies in power transmission and control such as Flexible AC Transmission Systems (FACTS). Numerous solved examples, interspersed throughout, illustrate the concepts discussed.

#### WHAT IS NEW TO THIS EDITION

- Provides two new chapters on Diesel Engine Power Plants and Power System Restructuring to make the students aware of the changes taking place in the power system industry.
- Includes more solved and unsolved problems in each chapter to enhance the problem solving skills of the students.

Primarily designed as a text for the undergraduate students of electrical engineering, the book should also be of great value to power system engineers.

**CONTENTS:** Preface. Preface to the First Edition. Introduction. Sources of Electric Energy. Basic Principles. Load Characteristics and Economic Aspects. Steam Power Plants. Hydroelectric Power Plants. Nuclear Power Plants. Gas Power Plants. Diesel Engine Power Plants. Transmission Line Parameters (Constants) Calculations. Analysis of Transmission Lines. Insulators for Overhead Transmission Lines. Design of Transmission Lines. Corona and Radio Interference. Insulated Cables. HVDC Transmission and FACTS Technology. Distribution Systems. Power Substations. Grounding Systems. Power System Restructuring. Bibliography. Answers to Problems. Index.

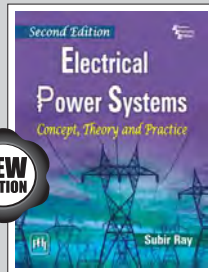
Latest Print 2014 / 452 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3560-8 / ₹ 350.00



## ENGINEERING

### Electrical/Electronics (POWER SYSTEM)

#### Electrical Power Systems: Concept, Theory and Practice, 2nd ed.



**SUBIR RAY**, Professor at MVJ College of Engineering, Bangalore.

This textbook, in its second edition aims to provide undergraduate students of Electrical Engineering with a unified treatment of all aspects of modern power systems, including generation, transmission and distribution of electric power, load flow studies, economic considerations, fault analysis and stability, high voltage phenomena, system protection, power control, and so on. The text systematically deals with the fundamental techniques in power systems, coupled with adequate analytical techniques and reference to practices in the field. Special emphasis is placed on the latest developments in power system engineering.

The book will be equally useful to the postgraduate students specialising in power systems and practising engineers as a reference.

#### NEW TO THIS EDITION

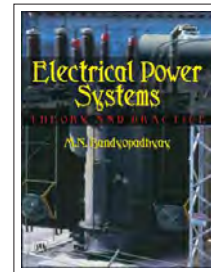
- Chapters on **Elements of Electric Power Generation and Power System Economics** are thoroughly updated.
- A new Chapter on **Control of Active and Reactive Power** is added.

**CONTENTS:** Preface. Introduction. Fundamental Concepts of AC Circuits. Part I: Electric Power Transmission and Distribution—General Considerations of Transmission and Distribution. Electrical Characteristics, Modelling and Performance of Aerial Transmission Lines. Overhead Line Construction. Underground Cables. Substation and Distribution System. Part II: Power System Operation—Elements of Electric Power Generation. Load Flow Studies. Power System Economics. Part III: Power System Transients and Protection—Introduction to Power System Transients. Over-Voltage Transients in Power Systems and Protection. Short-Circuit Phenomena. Elements of Circuit-Breakers and Relays. Power System Stability. FACTS and High Voltage DC Transmission. Control of Active and Reactive Power. Appendices—1: Laplace Transforms. 2: Iterative Methods for Solving Algebraic Equations. 3: Formation of Bus Admittance Matrix Using Singular Transformation. 4: Optimisation Technique. Bibliography. Index.



Latest Print 2014 / 680 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4951-3 / ₹ 550.00

#### Electrical Power Systems: Theory and Practice



**M.N. BANDYOPADHYAY**, Director of National Institute of Technology, Kurukshetra.

This book offers a comprehensive introduction to the subject of power systems, providing a systematic exposition of power generation, transmission, and distribution. The author has simplified the discussion of the core concepts, making the book student-friendly. Suitable for those pursuing engineering in electrical, mechanical, and industrial disciplines, the book will also be of immense interest to those working in the field of electrical power systems.

The book introduces the readers to the concept of 'power systems' and presents in detail the intricacies of hydroelectric, thermal, and nuclear power plants. Its area of emphasis, however, is power transmission and power distribution.

#### KEY FEATURES

- Comprehensive treatment of electrical power generation, transmission and distribution.
- Extensive treatment of switchgear and protection.
- Figures given to illustrate the concepts discussed at all appropriate places.
- Numerous analytical Solved Problems provided.
- Objective Type Questions provided to help the readers self-analyze their conceptual understanding.

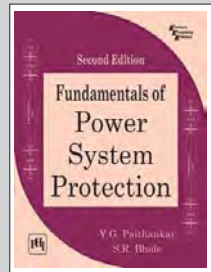
**CONTENTS:** Preface. Introduction. Hydroelectric Power Plant. Thermal Power Plant. Nuclear Power Plant. Magnetohydrodynamic System of Power Generation. Different Sources of Power Generation. Industrial Heating. Different Factors of Power System. Electrical Tariff. Parameters of Transmission System. Transmission and Distribution. Overhead Transmission Line. Transmission Line Insulator. Voltage and Current Relation of a Transmission Line. Distribution. Underground Cable. Load Flow Study. Stability of Power System. Symmetrical and Unsymmetrical Fault in Power System. Switchgear and Protection. Neutral Earthing. Corona. Miscellaneous Problems. Appendix. Objective Type Questions. Index.

Latest Print 2011 / 596 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2783-2 / ₹ 375.00

## ENGINEERING

### Electrical/Electronics (POWER SYSTEM)

#### Fundamentals of Power System Protection, 2nd ed.



**Y.G. PAITHANKAR**, formerly Professor and Head of Electrical Engineering Department at the Visvesvaraya National Institute of Technology, Nagpur.

**S.R. BHIDE**, is Assistant Professor of Electrical Engineering at the Visvesvaraya National Institute of Technology, Nagpur.


The electric power system is a highly complex and dynamic entity. One malfunction or a carelessly set relay can jeopardize the entire grid. Power system protection as a subject offers all the elements of intrigue, drama, and suspense while handling fault conditions in real life. The book reflects many years of experience of the authors in teaching this subject matter to undergraduate electrical engineering students.

The book, now in its second edition, continues to provide the most relevant concepts and techniques in power system protection. The second edition offers a new chapter on *circuit breakers* to further strengthen the text and meet the curriculum needs of several universities. Both, students and teachers, will find the book stimulating as it contains around 300 well-annotated figures and numerous tables. It also includes **20 quiz sets** consisting of about 200 multiple-choice questions to test the students' understanding of the concepts discussed.

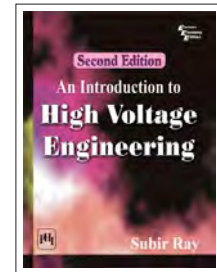
Written in a simple, clear and down-to-earth style, this state-of-the-art text covers the entire spectrum of protective relays—from electromechanical to numerical—for protection of transmission lines, transformers, busbars, generators, and motors. The presentation is stimulating, analytical but at the same time concise. The students will find the material very friendly and refreshingly simple.

The book has a wealth of useful figures, graphs, and block diagrams to help the students assimilate the concepts discussed and develop practical orientation.

**CONTENTS:** Preface. Introduction. Over-current Protection of Transmission Lines. Differential Protection. Transformer Protection. Busbar Protection. Distance Protection of Transmission Lines. Carrier-aided Protection of Transmission Lines. Generator Protection. Induction Motor Protection. Static Comparators as Relays. Numerical Protection. Circuit Breakers. Appendices—A. CT and PT Errors. B. Power Swing. C. Protection of Longest and Shortest Lines. Quizzes. References. Index.

 Latest Print 2014 / 380 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4123-4 / ₹ 375.00

#### Introduction to High Voltage Engineering, An, 2nd ed.



**SUBIR RAY**, Professor, Department of Electrical and Electronics Engineering, MVJ College of Engineering, Bangalore.

This concise textbook is intended for undergraduate students of electrical engineering offering a course in high voltage engineering.


Written in an easy-to-understand style, the text, now in its Second Edition, acquaints students with the physical phenomena and technical problems associated with high voltages in power systems. A complete quantitative description of the topics in high voltage engineering is difficult because of the statistical nature of the electrical breakdown phenomena in insulators. With this in mind, this book has been written to provide a basic treatment of high voltage engineering qualitatively and, wherever necessary, quantitatively.

Special emphasis has been laid on breakdown mechanisms in gaseous dielectrics as it helps students gain a sound conceptual base for appreciating high voltage problems. The origin and nature of lightning and switching overvoltages occurring in power systems have been explained and illustrated with practical observations. The protection of high voltage insulation against such overvoltages has also been discussed lucidly. The concept of modern digital methods of high voltage testing of insulators, transformers, and cables has been explained.

In the Second Edition, a new chapter on **electrostatic field estimation** and an appendix on **partial discharges** have been added to update the contents.

Solved problems help students develop a critical appreciation of the concepts discussed. End-of-chapter questions enable students to obtain a more in-depth understanding of the key concepts.

**CONTENTS:** Preface. Preface to the First Edition. Breakdown Mechanisms in Gases under Static Uniform Field. Breakdown Characteristics of Gases under Uniform Field. Breakdown of Gases in a Non-uniform Field. Lightning Phenomenon. Breakdown in Liquids and Solids. Generation of High Voltages. Measurement of High Voltages. Overvoltage Transients in Power Systems. High Voltage Testing of Power System Equipment. Electrostatic Field Estimation. Appendix: Partial Discharges (PDs). References. Index.

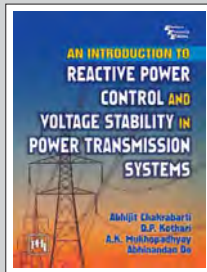
 Latest Print 2014 / 268 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4740-3 / ₹ 275.00



## ENGINEERING

### Electrical/Electronics (POWER SYSTEM)

#### Introduction to Reactive Power Control and Voltage Stability in Power Transmission Systems, An



**ABHIJIT CHAKRABARTI**, Vice-Chairman, West Bengal State Council of Higher Education and Professor and Former Head, Department of Electrical Engineering, Bengal Engineering and Science University, Shibpur, Howrah. He has also been Vice-Chancellor of Jadavpur University.

**D.P. KOTHARI**, Vice Chancellor of VIT University, Vellore.

**A.K. MUKHOPADHYAY**, Former Vice Chancellor of Tripura University and former Professor of Electrical Engineering in the Department of Applied Physics of Calcutta University.

**ABHINANDAN DE**, Senior Lecturer in the Department of Electrical Engineering, Bengal Engineering and Science University, Shibpur.

This text, intended for the students pursuing postgraduate programmes in Electrical Engineering, focuses special attention on the implications of reactive power in voltage stability of transmission systems. The basic concepts of power system stability and other operational aspects have been discussed. Both the advanced and the practical aspects have been highlighted. Modern concepts and applications, theoretical as well as simulated study, have been presented wherever necessary. In brief, the text presents a complete overview of the research and engineering aspects of the problem of stability, suitable both for academics and practising engineers, along with a brief historical review of the concerned topics.

In some instances the authors have included some of their own research results while maintaining the uniformity of overall treatment of the book. The text is replete with examples and is backed up by analytical derivations and physical interpretations, wherever considered necessary.

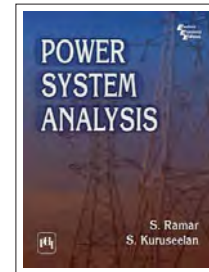
**CONTENTS:** Preface. Power Transmission in Uncompensated AC Transmission Lines. Reactive Power Flow and Voltage Control Problems. Voltage Stability: Fundamental Concepts. Power Transmission at Voltage Stability Limit. Voltage Stability Indicators. Assessment of Voltage Stability and Security. Voltage Control and Improvement of Voltage Stability in Power Transmission Systems. Index.

Latest Print 2011 / 272 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-4050-3 / ₹ 250.00



#### Power System Analysis



**S. RAMAR**, Professor and Head of the Department of Electrical and Electronics Engineering at SACS M.A.V.M.M. Engineering College, Madurai.

**S. KURUSEELAN**, Assistant Professor, Department of Electrical and Electronics Engineering, Bannari Amman Institute of Technology, Sathyamangalam, Erode.

Designed primarily as a textbook for senior undergraduate students pursuing courses in Electrical and Electronics Engineering, this book gives the basic knowledge required for power system planning, operation and control. The contents of the book are presented in simple, precise and systematic manner with lucid explanation so that the readers can easily understand the underlying principles.

The book deals with the per phase analysis of balanced three-phase system, per unit values and application including modelling of generator, transformer, transmission line and loads. It explains various methods of power flow equations and discusses fault analysis (balanced and unbalanced) using bus impedance matrix. It describes various concepts of power system stability and explains numerical methods such as Euler method, modified Euler method and Runge-Kutta methods to solve Swing equation. Besides, this book includes flow chart for computing symmetrical and unsymmetrical fault current, power flow studies and for solving Swing equation. It is also fortified with a large number of solved numerical problems and short-answer questions with answers at the end of each chapter to reinforce the students understanding of concepts.

This textbook would also be useful to the postgraduate students of power systems engineering as a reference.

**CONTENTS:** Foreword. Preface. Acknowledgements. Introduction. Modelling of Power System Components. Power Flow Analysis. Power Flow Solution Methods. Balanced Fault Analysis. Balanced Fault Analysis using Bus Impedance Matrix. Symmetrical Components and Sequence Networks. Unbalanced Fault Analysis. Power System Stability. Numerical Methods for Solving Swing Equation. GATE Questions.

Latest Print 2013 / 264 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4733-5 / ₹ 250.00



## ENGINEERING

### Electrical/Electronics (POWER SYSTEM)

#### Power System Analysis: Operation and Control, 3rd ed.

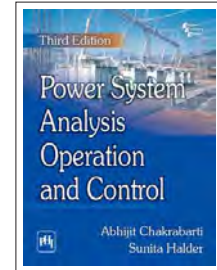
**ABHIJIT CHAKRABARTI**, *Vice-Chairman, West Bengal State Council of Higher Education and Professor and Former Head, Department of Electrical Engineering, Bengal Engineering and Science University, Shibpur, Howrah. He has also been Vice-Chancellor of Jadavpur University.*

**SUNITA HALDER** *is with the Department of Electrical Engineering, Jadavpur University, Kolkata.*

This comprehensive textbook introduces electrical engineering students and engineers to the most relevant concepts and techniques relating to all dimensions of electrical power system planning, operation and control. With an emphasis on both basics and advanced topics and practical aspects, the topics are substantiated by a number of illustrations and computer programs that reinforce the analytical methods of approaches to operation and control problems of power system engineering.

Besides fundamentals of power systems, the readers can learn about power flow, economic considerations, computer-aided economic load despatch, power system stability, fault analysis, high voltage transmission systems, transient analysis, and much more from this systematic treatment of an exhaustive treatise on power system engineering. The book is designed to cover courses in Power Systems conducted during third and fourth years of study by senior undergraduate students and to cover courses prescribed for postgraduate students as well.

The third edition includes the following eight new chapters to make the book complete from all angles of fundamental and advanced topics.



- Transmission Line Parameters (Chapter 2)
- Steady State Performance and Operation of Transmission Lines (Chapter 3)
- Power Cables (Chapter 4)
- Line Insulators (Chapter 5)
- Mechanical Design of Overhead Lines (Chapter 6)
- Corona (Chapter 7)
- EHV AC and HVDC Power Transmission (Chapter 17)
- Transient Analysis of Transmission Lines: Wave Propagation (Chapter 23)

**CONTENTS:** Preface. Preface to the Third Edition. Introduction. Transmission Line Parameters. Steady State Performance and Operation of Transmission Lines. Power Cables. Line Insulators. Mechanical Design of Overhead Lines. Corona. Modelling of Power System Components. Power Network Matrix Operations. Complex Power Flows. Economic Operation of Energy Generating Systems. Computer-Aided Economic Load Dispatch and Optimal Power Flow. Power System Control Centres. Automatic Generation Control. Study of Power System Stability. Computerised Fault Analysis. EHV AC and HVDC Power Transmission. Contingency Analysis and Power System Security. Reactive Power Control and Voltage Stability. Power System Compensation Using Passive and Facts Controllers. Small Signal Stability. State Estimation and Load Forecasting. Transient Analysis of Transmission Lines: Wave Propagation. Appendices. Bibliography. Index.

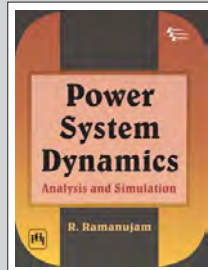
**Latest Print 2012 / 1272 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-4015-2 / 595.00**



## ENGINEERING

### Electrical/Electronics (POWER SYSTEM)

#### Power System Dynamics: Analysis and Simulation



**R. RAMANUJAM**, Professor, Department of Electrical and Electronics Engineering, College of Engineering, Guindy, Anna University, Chennai.

This comprehensive text offers a detailed treatment of modelling of components and sub-systems for studying the transient and dynamic stability of large-scale power systems. Beginning with an overview of basic concepts of stability of simple systems, the book is devoted to in-depth coverage of modelling of synchronous machine and its excitation systems and speed governing controllers. Apart from covering the modelling aspects, methods of interfacing component models for the analysis of small-signal stability of power systems are presented in an easy-to-understand manner.

The book also offers a study of simulation of transient stability of power systems as well as electromagnetic transients involving synchronous machines.

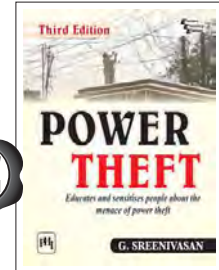
Practical data pertaining to power systems, numerical examples and derivations are interspersed throughout the text to give students practice in applying key concepts.

This text serves as a well-knit introduction to Power System Dynamics and is suitable for a one-semester course for the senior-level undergraduate students of electrical engineering and postgraduate students specializing in Power Systems.

**CONTENTS:** Preface. Once Over Lightly. Power System Stability—Elementary Analysis. Synchronous Machine Modelling for Power System Dynamics. Modelling of Other Components for Dynamic Analysis. Overview of Numerical Methods. Small-Signal Stability Analysis of Power Systems. Transient Stability Analysis of Power Systems. Sub-synchronous and Torsional Oscillations. Enhancement and Countermeasures. Index.

Latest Print 2013 / 528 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3525-7 / ₹ 450.00

#### Power Theft, 3rd ed.



**G. SREENIVASAN**, Resident Engineer with Kerala State Electricity Board, New Delhi.

Power theft is a silent crime that causes huge loss of revenue to power utilities. Despite advanced managerial and technical efforts to crack down on power thieves, power distribution entities are struggling hard to constrain the unscrupulous ways used to steal power. This book, now in its Third Edition, discusses some of the shocking methods used to commit power theft and enables the reader to identify, control and combat such power pilferage problems. The book provides graphic description of the *modus operandi* of power thieves and uncovers their cleverness and imagination in pilfering electricity.

There is no panacea for curbing power theft, and utilities have to develop their own ways. This book presents a vivid account of technical and administrative solutions that can go a long way in nipping the problem in bud. The most striking feature of the book is that it uses suitable photographs to analyse the problems from various angles.

#### NEW TO THIS EDITION

In the Third Edition, major judgments of Hon. Supreme Court relating to irregularities in power sector have been added. Power theft is very rampant in marijuana cultivation and is a source of social agony especially in the developed countries that has been described in the book with suitable photographs.

**CONTENTS:** Foreword. Preface. Preface to the First Edition. List of Abbreviations. Introduction to Power Theft. Security Seals, Modern Trends and Control of Power Theft. Power Theft in Electro-Mechanical Meters. Power Theft in Electronic Meter. Meddling with High Tension Metering Equipment. Important Judgements on Power Theft. Conclusion. Suggested Further Reading. Index.

2014 / 160 pp + 24 pp Colour Plates  
(Hard Cover) / 17.8 × 23.5 cm  
ISBN-978-81-203-4906-3 / ₹ 395.00



## ENGINEERING

### Electrical/Electronics (POWER SYSTEM)

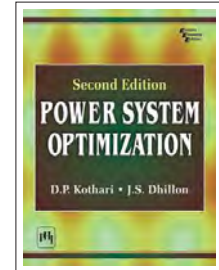
#### Power System Optimization, 2nd ed.

**D.P. KOTHARI**, *Director General of Vindhya Group of Institutions, Indore.*

**J.S. DHILLON**, *Professor, Department of Electrical and Instrumentation Engineering, Sant Longowal Institute of Engineering and Technology, Longowal, where he also served as the head of the department (from 2002 to 2005).*

*Power System Optimization* is intended to introduce the methods of multi-objective optimization in integrated electric power system operation, covering economic, environmental, security and risk aspects as well. Evolutionary algorithms which mimic natural evolutionary principles to constitute random search and optimization procedures are appended in this new edition to solve generation scheduling problems. Written in a student-friendly style, the book provides simple and understandable basic computational concepts and algorithms used in generation scheduling so that the readers can develop their own programs in any high-level programming language. This clear, logical overview of generation scheduling in electric power systems permits both students and power engineers to understand and apply optimization on a dependable basis. The book is particularly easy-to-use with sound and consistent terminology and perspective throughout.

This edition presents systematic coverage of local and global optimization techniques such as binary- and real-coded genetic algorithms, evolutionary algorithms, particle swarm optimization and differential evolutionary algorithms. The economic dispatch problem presented, considers higher-order nonlinearities and discontinuities in input-output characteristics in fossil fuel burning plants due to valve-point loading, ramp-rate limits and prohibited operating zones. Search optimization techniques presented are those which participate efficiently in decision making to solve the multiobjective optimization problems. Stochastic optimal generation scheduling is also updated in the new edition. *Generalized Z-bus distribution factors* (GZBDF) are presented to compute the active and reactive power flow on transmission lines. The interactive decision making methodology based on fuzzy set theory, in order to determine the optimal generation allocation to committed generating units, is also discussed.



This book is intended to meet the needs of a diverse range of groups interested in the application of optimization techniques to power system operation. It requires only an elementary knowledge of numerical techniques and matrix operation to understand most of the topics. It is designed to serve as a textbook for postgraduate electrical engineering students, as well as a reference for faculty, researchers, and power engineers interested in the use of optimization as a tool for reliable and secure economic operation of power systems.

#### KEY FEATURES

The book discusses:

- Load flow techniques and economic dispatch—both classical and rigorous
- Economic dispatch considering valve-point loading, ramp-rate limits and prohibited operating zones
- Real coded genetic algorithms for economic dispatch
- Evolutionary programming for economic dispatch
- Particle swarm optimization for economic dispatch
- Differential evolutionary algorithm for economic dispatch
- Stochastic multiobjective thermal power dispatch with security
- *Generalized Z-bus distribution factors to compute line flow*
- Stochastic multiobjective hydrothermal generation scheduling
- Multiobjective thermal power dispatch using artificial neural networks
- Fuzzy multiobjective generation scheduling
- Multiobjective generation scheduling by searching weight pattern

**CONTENTS:** Preface. Preface to the First Edition. Introduction. Load Flow Studies. Economic Load Dispatch of Thermal Generating Units. Optimal Hydrothermal Scheduling. Multiobjective Generation Scheduling. Stochastic Multiobjective Generation Scheduling. Evolutionary Programming for Generation Scheduling. Multiobjective Generation Scheduling: Weight Pattern Search. Appendices. Index.

Latest Print 2013 / 724 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4085-5 / ₹ 525.00



## ENGINEERING

Electrical/Electronics (POWER SYSTEM)

### Power System Transients: A Statistical Approach, 2nd ed.

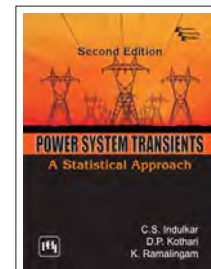
**C.S. INDULKAR**, former Professor of Electrical Engineering, Indian Institute of Technology Delhi as well as Visiting Professor, University of Technology, Papua New Guinea.

**D.P. KOTHARI**, Director General of Vindhya Group of Institutions, Indore.

**K. RAMALINGAM**, Managing Director, Super Airport Infrastructure (India), and Independent Director on the Board of CIAL Aviation Academy, Cochin International Airport.

This book, now in its second edition, presents a comprehensive exposition of the basic principles involved in the analysis and computation of power system transients using a statistical approach. The book deals with probability distribution of switching overvoltages in overhead lines, underground cables, and machine windings. The accuracy of statistical methods for power system transients, including the suitability of Gaussian distribution for these methods, is discussed. In the case of overhead lines, a simplified statistical method for estimating the phase-to-phase risk of insulation failure is explained.

The new edition covers the latest research developments in this field. Analysis and modelling of noise as well as prediction of voltage sags in power lines, statistical evaluation of lightning overvoltages, application of ANN algorithm, and use of correlation algorithm for identification of inrush and fault currents in transformers are the major topics presented. Waveshape-based analysis of switching overvoltages and design procedure for insulation coordination are also dealt with in detail.



**CONTENTS:** Preface. Preface to First Edition. Introduction. Probability Distribution of Switching Surge Overvoltages. Application of Insulators to Withstand Switching Surges. Probability of Failure of an EHV Transmission Line. Accuracy of Statistical Methods in Insulation Evaluation. Statistical Estimation of Phase-to-Phase Risk of Failure. Suitability of Gaussian Stress Distribution for Statistical Line Insulation Design. Statistical Distribution of Impulse Breakdown in Oil-Filled Cable. Method of Grading EHV Cables Based on Statistical Breakdown Stress. Probability of Failure of Motor Windings. Frequency of Occurrence of Lightning Flashes and Shielding of Transmission Lines. Characteristics of External Insulation. General Aspects of Insulation Coordination. A Case Study of Statistical Switching Overvoltages in a Phase-Shifting Transformer. Statistical Evaluation of Peak Switching Overvoltages in EHV Overhead Lines. Statistical Evaluation of Peak Switching Overvoltages in EHV Underground Cables. Statistical Analysis and Modelling of Noise in Medium Voltage Power Lines. Statistical Prediction of Voltage Sags. Statistical Analysis of Lightning Performance of Power Lines. Application of ANNs for Statistical Evaluation of Lightning Overvoltages on Overhead Distribution Lines. Use of Correlation Algorithm for Identification of Inrush and Internal Faults in Transformer. Insulation Coordination Procedure Based on the Switching Overvoltage Waveshape. Appendix. References. Index.

Latest Print 2012 / 296 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-4079-4 / ₹ 275.00

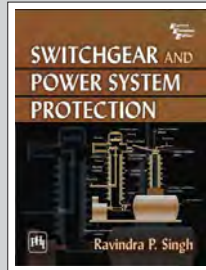


## ENGINEERING

### Electrical/Electronics (POWER SYSTEM)

#### Switchgear and Power System Protection

**RAVINDRA P. SINGH,**  
*Principal, Applied College of Management and Engineering Palwal, Faridabad. Haryana.*



This comprehensive introduction to system protection covers the underlying principles of operation of switchgear and several relay protective schemes used in power systems and elucidates their important requirements to provide the basis for design criteria. Besides, the book contains a detailed treatment of protective schemes used to encounter fault conditions that may occur individually in generators, motors, transformers, busbars, and distribution circuits. Protection against switching surges and lightning is also discussed.

The final chapter on power system management provides a simple introduction to that important area in order to emphasize the importance of optimal economic operation of power systems in which protective schemes under fault conditions play a crucial role towards continuity of electrical supply with minimum damage to life, equipment and property.

#### KEY FEATURES

- Provides numerous solved examples and chapter-end exercises to reinforce understanding of concepts.
- Gives MATLAB programs to solve numerical problems.
- Provides more than a hundred fill in the blanks questions with answers under the heading *Test Your Knowledge* at the end of the book to help students in preparing for the competitive examinations.
- Offers a long list of research papers and books under bibliography to acquaint the researchers with the developments in the field.

The book is appropriate for undergraduate students of electrical engineering for a one-semester course in Power System Protection and Switchgear. It would also be useful to postgraduate students specializing in power engineering, research scholars and practising power engineers.

**CONTENTS:** Preface. Part A: Switchgear—Definitions and Terminology. Basics of Switchgear. High Voltage Circuit-breakers. Current-limiting Reactors. Part B: Power System Protection—Introduction. Protection Schemes. Micro-processor-based Digital Relaying. Static Relays. Travelling Wave Relays. Pilot Relay Protection. Apparatus Protection. Recent Developments in Digital Protection. Network Relays. Surge Protection and Insulation Coordination. Power System Management. Test Your Knowledge. Bibliography. Index.

Latest Print 2011 / 348 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3660-5 / ₹ 275.00

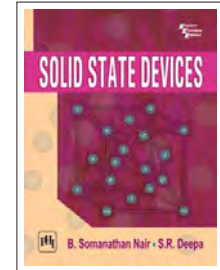


PHI Learning: Publications

### Electrical/Electronics (SEMICONDUCTOR DEVICES)

#### Solid State Devices

**B. SOMANATHAN NAIR,**  
*Principal, Pankaja Kasthuri College of Engineering and Technology, Thiruvananthapuram (Kerala).*  
**S.R. DEEPA,** *Professor and Head, Department of Electronics and Communication Engineering, Pankaja Kasthuri College of Engineering and Technology, Thiruvananthapuram*



Designed as a text for undergraduate students of engineering in Electrical, Electronics, and Computer Science and IT disciplines as well as undergraduate students (B.Sc.) of physics and electronics as also for postgraduate students of physics and electronics, this compact and accessible text endeavours to simplify the theory of solid state devices so that even an average student will be able to understand the concepts with ease. The authors, Prof. Somanathan Nair and Prof. S.R. Deepa, with their rich and long experience in teaching the subject, provide a detailed discussion on such topics as crystal structures of semiconductor materials, Miller indices, energy-band theory of solids, energy level diagrams and mass action law. Besides, they give a masterly analysis of topics such as direct and indirect gap materials, Fermi-Dirac statistics, and electrons in semiconductors. Finally, they deal with Hall effect, PN junction diodes, Zener and avalanche breakdowns, Schottky-barrier diodes, bipolar junction transistors, MOS field-effect transistors, Early effect, Shockley diodes, SCRs, TRIAC, and IGBTs.

#### Distinguishing Features

- Discusses the concepts in an easy-to-understand style.
- Furnishes over 300 clear-cut diagrams to illustrate the concepts discussed.
- Gives a very large number of questions—short answer, fill in the blanks, tick the correct answer and review questions—to sharpen the minds of the reader.
- Provides more than 200 fully solved numerical problems.
- Gives answers to a large number of exercises.

This fully illustrated and well-organized text should prove invaluable to students pursuing various courses in engineering and physics.

**CONTENTS:** Preface. PART 1—Crystal Structures. Energy-Band Theory of Solids. Carrier Transport in Semiconductors. Excess Carriers in Semiconductors. PN Junction Diodes. PART 2—Electrical Breakdown in PN Junctions. Bipolar Junction Transistors. PART 3—The Field-Effect Transistor. The Unijunction Transistor. Silicon-Controlled Rectifier. The Triode AC Switch (TRIAC). The Insulated-Gate Bipolar Transistor. Appendix A. Appendix B. Random Viva-Voce Questions. Answers to Exercises. Index.

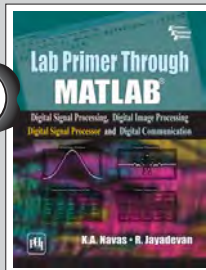
Latest Print 2013 / 392 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4106-7 / ₹ 350.00



## ENGINEERING

### Electrical/Electronics (SIGNALS/SIGNAL PROCESSING)

Lab Primer through MATLAB®: Digital Signal Processing, Digital Image Processing, Digital Signal Processor and Digital Communication



**K.A. NAVAS**, Principal, LBS College of Engineering, Kerala.  
**R. JAYADEVAN** is Assistant Professor, Department of Electronics and Communication Engineering, Sreepathy Institute of Management and Technology, Kerala.

This systematically designed laboratory manual elucidates a number of techniques which help the students carry out various experiments in the field of digital signal processing, digital image processing, digital signal processor and digital communication through MATLAB® in a single volume. A step-wise discussion of the programming procedure using MATLAB® has been carried out in this book. The numerous programming examples for each digital signal processing lab, image processing lab, signal processor lab and digital communication lab have also been included.

The book begins with an introductory chapter on MATLAB®, which will be very useful for a beginner. The concepts are explained with the aid of screenshots. Then it moves on to discuss the fundamental aspects in digital signal processing through MATLAB®, with a special emphasis given to the design of digital filters (FIR and IIR). Finally digital communication and image processing sections in the book help readers to understand the commonly used MATLAB® functions. At the end of this book, some basic experiments using DSP trainer kit have also been included.

This book is intended for the undergraduate students of electronics and communication engineering, electronics and instrumentation engineering, and instrumentation and control engineering for their laboratory courses in digital signal processing, image processing and digital communication.

#### KEY FEATURES

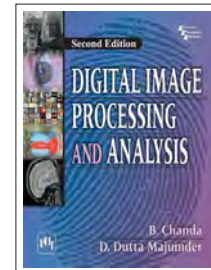
- Includes about 115 different experiments.
- Contains several figures to reinforce the understanding of the techniques discussed.
- Gives systematic way of doing experiments such as Aim, Theory, Programs, Sample inputs and outputs, Viva voce questions and Examination questions

**CONTENTS:** Preface. Familiarization of MATLAB®. Digital Signal Processing Lab. Image Processing Lab. Digital Signal Processor Lab. Digital Communication Lab. Index.

Latest Print 2014 / 356 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4932-2 / ₹ 350.00



Digital Image Processing and Analysis, 2nd ed.



**BHABATOSH CHANDA**, Professor, Electronics and Communication Sciences Unit, Indian Statistical Institute, Kolkata.

**DWIJESH DUTTA MAJUMDER**, Professor Emeritus, Electronics and Communication Sciences Unit, Indian Statistical Institute, Kolkata.

The second edition of this extensively revised and updated text is a result of the positive feedback and constructive suggestions received from academics and students alike. It discusses the fundamentals as well as the advances in digital image processing and analysis—both theory and practice—to fulfil the needs of students pursuing courses in Computer Science and Engineering (CSE) and Electronics and Communication Engineering (ECE), both at undergraduate and postgraduate levels. It is also considered useful for teachers, professional engineers and researchers.

The second edition has three objectives. First, each and every chapter has been modified in the light of recent advances as well as emerging concepts. Second, a good deal of colour image processing has been incorporated. A large number of line drawings and images have been included to make the book student friendly. Third, some new problems have been added in almost all chapters to test the student's understanding of the real-life problems.

The other distinguishing features of the book are:

- A summary at the end of the chapter to help the student capture the key points.
- About 320 line drawings and 280 photographs for easy assimilation of the concepts.
- Chapter-end problems for extensive practice and research.

**CONTENTS:** Preface. Acknowledgements. Part I: Digital Image—Introduction. Mathematical Preliminaries. Visual Preliminaries. Image Formation. Digitization. Part II: Image Processing—Image Enhancement. Restoration. Image Compression. Registration. Multi-valued Image Processing. Part III: Image Analysis—Segmentation. Edge and Line Detection. Feature Extraction. Description. Recognition. Index.

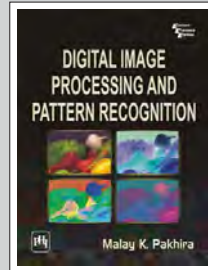
Latest Print 2012 / 488 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4325-2 / ₹ 325.00



## ENGINEERING

Electrical/Electronics (SIGNALS/SIGNAL PROCESSING)

### Digital Image Processing and Pattern Recognition



**MALAY K. PAKHIRA**, Associate Professor in the Department of Computer Science and Engineering, Kalyani Government Engineering College, Kalyani, West Bengal.

This book is designed for undergraduate and postgraduate students of Computer Science and Engineering, Information Technology, Electronics and Communication Engineering, and Electrical Engineering.

The book comprehensively covers all the important topics in digital image processing and pattern recognition along with the fundamental concepts, mathematical preliminaries and theoretical derivations of significant theorems. The image processing topics include coverage of image formation, digitization, lower level processing, image analysis, image compression, and so on. The topics on pattern recognition include statistical decision making, decision tree learning, artificial neural networks, clustering and others. An application of simulated annealing for edge detection is described in an appendix. The book is profusely illustrated with more than 200 figures and sketches as an added feature.

#### KEY FEATURES

- Provides a large number of worked examples to strengthen the grasp of the concepts.
- Lays considerable emphasis on the algorithms in order to teach students how to write good practical programs for problem solving.
- Devotes a separate chapter to currently used image format standards.
- Offers problems at the end of each chapter to help students test their understanding of the fundamentals of the subject.

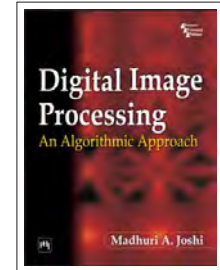
**CONTENTS:** Preface. Introduction. Image Acquisition. Sampling and Digitization. Fundamentals of Digital Images. Image Transforms. Image Enhancement. Colour Image Processing. Image Restoration. Image Registration. Edge Detection. Image Segmentation. Image Compression. Image File Formats. Feature Extraction and Representation. Pattern Recognition. Classification and Decision Making. Statistical Decision Making. Nearest Neighbour Classifier. Decision Tree Learning. Recognition and Artificial Neural Networks. Clustering. Appendix: Edge Detection using Simulated Annealing. Index.

Latest Print 2014 / 524 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4091-6 / ₹ 425.00



PHI Learning: Publications

### Digital Image Processing: An Algorithmic Approach



**MADHURI A. JOSHI**, Professor of Electronics at the College of Engineering, Pune.

This introduction to the fundamental concepts and methodologies of image processing is suitable for first-year postgraduate and senior undergraduate students in almost any engineering discipline, and in particular meets the requirement of the prescribed courses in the following streams:

- Electronics and Communication
- Computer Science and Engineering
- Information and Communication Technology

The book offers a balanced exposition of basic principles and applications of image processing. It lays considerable emphasis on the algorithmic approach in order to teach students how to write good practical programs for problem solving.

#### MAJOR TOPICS COVERED INCLUDE

- Image fundamentals
- Different image transforms
- Image enhancement in the spatial and frequency domains
- Restoration
- Image analysis
- Image description
- Image compression, and
- Image reconstruction from projections
- Applications of image processing in the areas of biometrics, speaker recognition, satellite imaging, medical imaging, and many more.

The style of presentation is comprehensive and application oriented, comprising examples, diagrams, image results, case studies of applications, and review questions—making it easy for students to understand key ideas, their practical relevance and applications.

**CONTENTS:** Preface. Digital Image Processing. Different Image Transforms. Image Enhancement. Restoration. Image Analysis. Applications of Image Processing. Image Coding and Image Compression. Computer Tomography. C Programs. Appendix A: Algorithm for Hadamard Transforms. Appendix B: Examples of Watermarking Using a Block Transform. References. Index.

Latest Print 2013 / 356 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2971-3 / ₹ 325.00



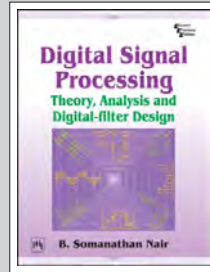


## ENGINEERING

### Electrical/Electronics (SIGNALS/SIGNAL PROCESSING)

#### Digital Signal Processing: Theory, Analysis and Digital-filter Design

**B. SOMANATHAN NAIR,**  
Principal, Pankaja Kasthuri College  
of Engineering and Technology,  
Thiruvananthapuram (Kerala).



This textbook for a one-semester course in Digital Signal Processing and Filter Design is suitable for undergraduate students of Electrical and Electronics Engineering, Electronics and Instrumentation Engineering, Instrumentation and Control Engineering, Electronics and Communication Engineering, Computer Science and Engineering, and Information Technology. Besides, it will also be a useful text for students pursuing applied sciences degree courses in Electronics, Computer Science, Computer Applications, and Information Technology.

Though DSP is often treated as a complicated theoretical subject, this book through several worked examples strives to provide a motivating introduction to fundamental concepts, principles and applications of DSP.

Building on the basic theory of DSP, the transformations techniques of signals such as Discrete-Time Fourier Transform (DTFT), Discrete Fourier Transform (DFT), Fast-Fourier Transform (FFT), and  $z$ -transform are discussed in detail.

Several chapters are devoted to design and practical implementation schemes of analog and digital filters. The design of IIR filters using the Butterworth, Chebyshev, and Inverse Chebyshev approximations is illustrated. The design of FIR filters based on the Fourier-series and frequency-sampling methods, is discussed.

Owing to their importance in DSP, the differential and difference equations are discussed in the penultimate chapter. The final chapter describes some of the practical applications of DSP.

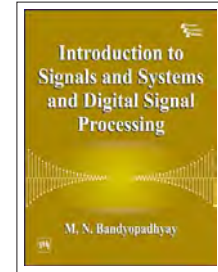
**CONTENTS:** Preface. Basic Principles of Signal Processing. Basic Principles of Digital Signal Processing. Signals and Functions Encountered in Signal Processing. Systems and Their Properties. Transformations. Discrete Fourier Transformation. Fast-Fourier Transformation. Fundamental Principles of Filters. Step-by-Step Design of Analog Filters. Step-by-Step Design of Digital IIR Filters. Structures for Realizing Digital IIR Filters. Step-by-Step Design of Digital FIR Filters. Structure for Realizing Digital FIR Filters. Finite-Register-Length Problems in Digital Filters. Differential Equations and Difference Equations Related to Systems. Applications of Digital Signal Processing. Appendices—A. The Generalized Twiddle-Factor Table. B. Analysis of Active Low-Pass Filters. C. The Gibb's Phenomenon. D. Enlarged Table of Modified Bessel Function,  $I_0(x)$ . Index.

Latest Print 2013 / 488 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-2595-1 / ₹ 325.00



#### Introduction to Signals and Systems and Digital Signal Processing



**M.N. BANDYOPADHYAY,** Director of National Institute of Technology, Kurukshetra.

With an interesting approach to educate the students in signals and systems, and digital signal processing simultaneously, this book not only provides a comprehensive introduction to the basic concepts of the subject but also offers a practical treatment of the modern concepts of digital signal processing.

Written in a cogent and lucid manner, the book is addressed to the needs of undergraduate engineering students of electrical, electronics, and computer disciplines, for a first course in signals and digital signal processing.

#### KEY FEATURES

- Detailed coverage of the signals, systems, and network concepts.
- Extensive treatment of mathematical tools like Fourier analysis, Laplace transformation, and Z-transformation.
- Lucid explanation of FIR, IIR, DFT, and FFT.
- Presentation of discrete time analysis of signals and systems, and discrete time systems in frequency domain.
- Solved examples in each chapter to reinforce the understanding of the topics covered.
- Numerous objective type questions and exercises.
- Discussion on practical applications of digital signal processing.

**CONTENTS:** Preface. Part I: Signals and Systems—Introduction. Fourier Analysis. Laplace Transformation and its Application in Signal Analysis. System Analysis. Part II: Digital Signal Processing—Introduction to Digital Signal Processing. Mathematical Tools for Digital Signal Processing. Discrete Time Analysis of Signals and Systems. Discrete Time System in Frequency Domain. Multirate Digital Signal Processing. Application of Digital Signal Processing. Appendices. Index.

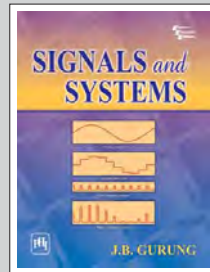
Latest Print 2009 / 396 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-2778-8 / ₹ 250.00

## ENGINEERING

### Electrical/Electronics (SIGNALS/SIGNAL PROCESSING)

#### Signals and Systems



**J.B. GURUNG**, Assistant Professor at the Department of Electronics and Communication Engineering, Lovely Professional University, Phagwara.

A valuable introduction to Signals and Systems, this textbook has been developed by the author from his experience of teaching this particular subject to undergraduate students. It is suitable for B.E./B.Tech students in such disciplines as Electrical Engineering, Electronics and Communication Engineering, Computer Science and Engineering, Information Technology, and Biomedical Engineering.

The book provides a clear understanding of the issues that students face in assimilating this highly mathematical subject. It is a comprehensive analytical treatment of signals and systems with a strong emphasis on solving problems. Each topic is supported by sufficient numbers of solved examples. Besides, a variety of tricky objective type questions have been included at the end of every chapter.

Emphasizing systems approach, the book offers a unified treatment of both continuous-time and discrete-time signals and systems. The analysis tools such as Fourier transform, Laplace transform, sampling theorem and Z-transform are presented elaborately. Conceptual understanding is reinforced through plenty of worked examples.

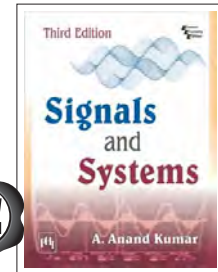
The book concludes with a chapter focused on realization of Finite Impulse Response (FIR) and Infinite Impulse Response (IIR) filters. Several appendices provide the requisite background mathematical material for ease of reference by the students.

**CONTENTS:** Preface. Representation of Signals. Analysis of Continuous-Time Signals and Systems. Sampling Theorem and Z-Transforms. Discrete-Time Systems. Systems with Finite and Infinite Duration Impulse Response. Appendices A-F. Index.

Latest Print 2011 / 636 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3422-9 / ₹ 395.00

#### Signals and Systems, 3rd ed.

**A. ANAND KUMAR**,  
Principal, K.L. University College of  
Engineering, K.L. University,  
Vijayawada, Andhra Pradesh.



The Third Edition of this well-received text continues to provide coherent and comprehensive coverage of signals and systems. It is designed for undergraduate students of electronics and communication engineering, telecommunication engineering, electronics and instrumentation engineering, and electrical and electronics engineering. The book will also be useful to AMIE and IETE students.

Written with student-centred, pedagogically driven approach, the text provides a self-contained introduction to the theory of signals and systems. This book looks at the concepts of systems, and also examines signals and the way that signals interact with physical systems. It covers topics ranging from basic signals and systems to signal analysis, properties of continuous-time Fourier transforms including Fourier transforms of standard signals, signal transmission through linear systems, relation between convolution and correlation of signals, sampling theorems and techniques, and transform analysis of LTI systems. All the solved and unsolved problems in this book are designed to illustrate the topics in a clear way.

#### **New to This Edition**

MATLAB Programs at the end of each chapter

#### **KEY FEATURES**

- Numerous worked-out examples in each chapter
- Short questions with answers help students to prepare for examinations
- Objective type questions and unsolved problems at the end of each chapter to test the level of understanding of the subject.

**CONTENTS:** Preface. Preface to the First Edition. Signals. Systems. Signal Analysis. Fourier Series Representation of Periodic Signals. Fourier Transforms. Signal Transmission through Linear Systems. Convolution and Correlation of Signals. Sampling. Laplace Transforms. Z-Transforms. System Realization. Discrete-time Fourier Transform. Appendices. Glossary. Answers. Index.

Latest Print 2014 / 1044 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4840-0 / ₹ 525.00

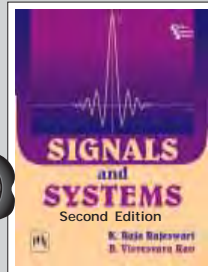


## ENGINEERING

**Electrical/Electronics (SIGNALS/SIGNAL PROCESSING)**

**Engineering Geology (FUNDAMENTAL/GENERAL)**

### Signals and Systems, 2nd ed.



**K. RAJA RAJESWARI**, *Principal, Viswanadha Institute of Technology and Management (VITAM), Visakhapatnam. Earlier, she has served as Professor in the Department of Electronics and Communication Engineering, College of Engineering (Autonomous), Andhra University, Visakhapatnam.*

**B. VISVESVARA RAO**, *Professor and Head, Department of Electronics and Communication Engineering, Mahaveer Institute of Science and Technology (MIST), Hyderabad.*

The book, in its Second Edition, continues to provide a comprehensive treatment of signals and systems commencing from an elementary level and going on to a thorough analysis of mathematical tools such as Fourier transform, Laplace transform, Z-transform and Discrete-time Fourier transform. The concepts of convolution and correlation and their relationship have been explained in a clear and lucid manner. Both continuous-time and discrete-time signals and systems have been covered, and thoroughly supported with adequate number of explained examples.

The book is intended for the BE/BTech students of Electrical Engineering, Electronics and Communication Engineering, Computer Science and Engineering, Information Communication Technology (ICT), Telecommunication Engineering and Biomedical Engineering.

#### NEW TO THIS EDITION

- A new chapter on MATLAB programming for generation of continuous-time and discrete-time series is added.
- MATLAB solutions have been given for stability testing of discrete-time systems.
- Sections on simple electronic systems realization have been added in existing chapter 6.
- More solved examples, problems and multiple choice questions, have been added in almost every chapter to reinforce the understanding of the theory.

**CONTENTS:** Preface. Preface to the First Edition. Signals—An Introduction. Systems—An Introduction and Time Domain Analysis. Fourier Series Analysis of Continuous-Time Signals. The Continuous-Time Fourier Transform. Sampling. Convolution, Correlation and Transmission of Signals Through Linear Systems. The Laplace Transform. Z-Transforms. The Realization System Function Using Laplace Transform and Z-Transform. The Discrete-Time Fourier Transform. Signals and Systems with MATLAB. Index.

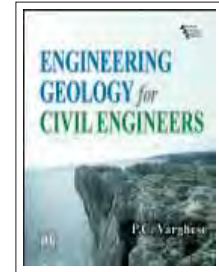
Latest Print 2014 / 344 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4941-4 / 325.00



225

### Engineering Geology for Civil Engineers



**P.C. VARGHESE**, *Honorary Professor at Anna University, Chennai, was formerly Professor and Head, Department of Civil Engineering, IIT Madras.*

Geology is the science of earth's crust (lithosphere) consisting of rocks and soils. While mining and mineralogical engineers are more interested in rocks, their petrology (formation) and mineralogy, civil engineers are equally interested in soils and rocks, in their formations, and also in their properties for civil engineering design and construction. This book is so written that the subject can easily be taught by a civil engineering faculty member specialised in soil mechanics.

Dexterously organized into four parts, this book in Part I (Chapters 1 to 11) deals with the formation of rocks and soils. The classification of soils, lake deposits, coastal deposits, wind deposits along with marshes and bogs are described in Part II (Chapters 12 to 20). As the book advances, it deals with the civil engineering problems connected with soils and rocks such as landslides, rock slides, mudflow, earthquakes, tsunami and other natural phenomena in Part III (Chapters 21 to 24). Finally, in Part IV (Chapters 25 to 30), this text discusses the allied subjects like the origin and nature of cyclones, rock mass classification and soil formation.

Designed to serve as a textbook for the undergraduate students of civil engineering, this book is equally useful for the practising civil engineers.

**CONTENTS:** Foreword. Preface. Introduction. Part I: Formation of Rocks—Historical Geology. Elements and Minerals. Rocks and Their Formations. Igneous Rocks. Sedimentary Rocks. Metamorphic Rocks. Structural Features in Rocks. Chemical Weakening of Rocks. Engineering Properties of Rocks. Weathering of Rocks and Geomorphology. Groundwater and Groundwater Recharging. Part II: Formation of Soil Deposits—Field Identification and Classification of Soils. Streams, Rivers and Their Deposits. Lake Deposits. Coastal Deposits. Wind Deposits. Marshes and Peat Deposits (MUSKEG), Bogs. Some Special Indian Soils and Rocks. Landslides, Rockslides, Rock Falls and Land Subsidence. Mud Flows. Part III: Application of Engineering Geology to Civil Engineering Projects / Works—Geological Investigations for Reservoirs and Dam Sites. Geological Investigations for Roads, Railways and Bridges. Tunnelling in Rocks. Earthquakes, Tsunami and Seiche. Part IV: Allied Subjects—Geological Maps, Geophysical Exploration and Boring in Soils. Investigation for Large Projects Field Tests in Soils, Rock Boring and Preparation of Project Reports. Origin and Nature of Cyclones. Rock Forming Minerals. Rockmass Classification in Engineering Geology. Geology and Sub-surface Soil Conditions of Some Important Regions of India. Appendices. Index.

Latest Print 2014 / 264 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4495-2 / 250.00

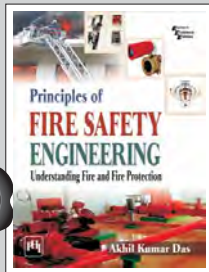


PHI Learning: Publications

## ENGINEERING

### Fire Safety Engineering

#### Principles of Fire Safety Engineering: Understanding Fire and Fire Protection



**AKHIL KUMAR DAS**, Visiting Professor at University of Petroleum & Energy Studies (UPES), Dehradun, Consultant Professor at NETES Institute of Technology and Science (NITS), Guwahati and a practising consultant.

Fire Safety is the science of fire and the means of protection against it. Being multidisciplinary in nature, the subject is closely related to chemical engineering, building services, electrical, electronics, structural and civil engineering and industrial engineering.

There is a dearth of books on this subject, and therefore, the author aims to provide readers with a lucidly written, comprehensive text explaining the fundamentals of the fire process and means of protection.

Comprising eleven chapters, this well-illustrated book with data tables begins with the introduction of the subject and then proceeds to explain fire process, its chemistry, heat and temperature in fire, hydraulics, active and passive fire protection systems, risk management and insurance, and finally investigations and reconstructions of fire incidents. The book appends useful information on fire safety including cases to explain the causes of fire, Indian Standards on fire safety, explosion and properties of some flammable materials.

Fire safety engineering students and professionals will find this book of immense use to them.

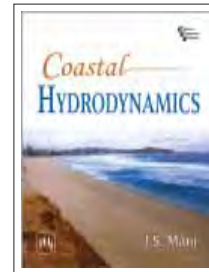
**CONTENTS:** Preface. Introduction. The Fire Process. Chemistry of Fire. Heat Transfer in Fires. Hydraulics, Pumps and Primers. Fire Science for the Built Environment. Fire Detectors and Alarms. Fire Extinguishers. Fixed Fire Protection Systems. Risk Management and Fire Insurance. Investigating Fire Incidents. **Appendices**—1: Explosions Explained. 2: Remembered for the Wrong Reasons. 3: Indian Statutes/Standards Related to Fire Safety. 4: Fire Properties of Some Flammable Materials. Suggested Further Reading. Index.

Latest Print 2014 / 208 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-5038-0 / ₹ 250.00



### Marine Engineering (HYDRODYNAMICS)

#### Coastal Hydrodynamics



**J.S. MANI**, Professor, Department of Ocean Engineering, Indian Institute of Technology Madras.

In the recent past, mushrooming coastal industries and human settlements have led to fast depletion of coastal features, overexploitation of both living and non-living ocean resources and abuse of ocean and coastal waters, resulting in nature's aggression in the form of tsunami and storms. It is therefore necessary to understand nature to maintain harmony. This book deals with the characteristics of various natural processes that govern the coastal equilibrium.

The book gives an overview of world population and ocean resources, natural threats and man-made hazards, and their impact on coastal environment. It discusses the fundamentals of wind, waves, tides and fluid flow and describes wave theories such as linear wave theory, Stokes higher order theories, cnoidal and solitary wave theories. The text also explains the methods of estimating wave forces experienced by coastal and offshore structures. Besides, it deals with the procedures involved in the analysis of wave data and wave prediction, and sediment transport in the coastal region.

The book is intended for the undergraduate and postgraduate students of Ocean Engineering and Marine Engineering. It will also be useful for coastal engineers and managers in understanding the impact of natural processes on coastal environment.

#### KEY FEATURES

- Exercises given at the end of each chapter would benefit the reader to get exposed to a variety of practical problems related to coastal engineering.
- Worked out examples can be used for understanding available methods to solve problems related to coastal engineering.

**CONTENTS:** Preface. Introduction. Fundamentals of Wind, Waves, Tides and Fluid Flow. Wave Theories. Wave Forces on Coastal and Offshore Structures. Wave Statistics and Wave Prediction. Sediment Transport In Coastal Region. Appendices—A: Tables for  $h/L_0$  and  $h/L$ . B: Fresnel Integrals. C: Coefficients for Stokes' 5th Order Theory. Index.

Latest Print 2012 / 336 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4429-7 / ₹ 395.00

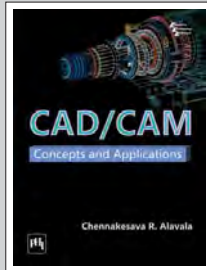


## ENGINEERING

### Mechanical (Automated Manufacturing)

#### 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 2014 / 564 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3340-6 / ₹ 325.00



#### 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.

**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



## ENGINEERING

**Mechanical (Automated Manufacturing)**

### 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

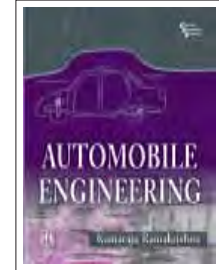
ISBN-978-81-203-3345-1 / ₹ 350.00



PHI Learning: Publications

**Mechanical (Automobile Engineering)**

### 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 trouble-shooting 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

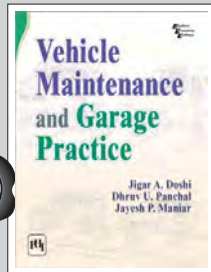
ISBN-978-81-203-4610-9 / ₹ 350.00



## ENGINEERING

### Mechanical (AUTOMOBILE ENGINEERING)

#### 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 IIIE.

**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.

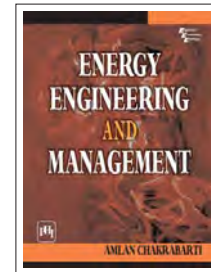
**CONTENTS:** Preface. Vehicle Maintenance Practices. Service Station Operations. Tools and Equipments. Measuring Instruments. Engine Service and Repair. Fuel Supply System. Cooling System Maintenance. Ignition System—Service, Repair and Overhaul. Lubrication System. Clutch Repair and Maintenance. Transmission, 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

### Mechanical (ENERGY STUDIES)

#### 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.

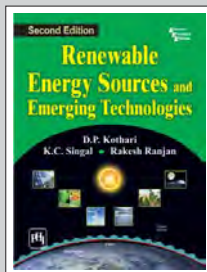
Latest Print 2013 / 264 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4233-0 / ` 295.00



## ENGINEERING

### Mechanical (ENERGY STUDIES)

#### Renewable Energy Sources and Emerging Technologies, 2nd ed.



**D.P. KOTHARI**, Director General of Vindhya Group of Institutions, Indore.

**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.

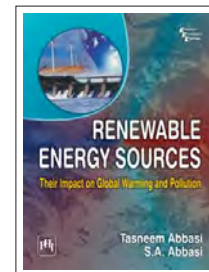
**CONTENTS:** Preface. Preface to the First Edition. Energy Resources and Their Utilisation. Environmental Aspects of Electric Energy Generation. Solar Radiation and Its Measurement. Solar Thermal Energy Collectors. Solar Thermal Energy Conversion Systems. Solar Photovoltaic System. Wind Energy. Wind Energy Farms. Small Hydropower. 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

PHI Learning: Publications

#### Renewable Energy Sources: Their Impact on Global Warming and Pollution



**TASNEEM ABBASI**, Assistant Professor, Centre for Pollution Control and Energy Technology, Pondicherry University, Pondicherry.

**S.A. ABBASI**, Senior Professor and Coordinator, Centre for Pollution Control and Energy Technology, 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.**

— Dr. FAROOQ ABDULLAH  
Hon'ble Minister, New and Renewable Energy  
Government of India

**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. 8. Tidal Energy. Geothermal Energy. Small Hydro. Hydrogen as a Renewable Energy Source. Storage of Intermittently-generated Renewable Energy. Decarbonization of Fossil Fuel Use by CO<sub>2</sub> Capture. Is the Use of Renewable Energy Sources an Answer to the Problems of Global Warming and Pollution? References. Index.

Latest Print 2013 / 332 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3994-1 / ₹ 325.00

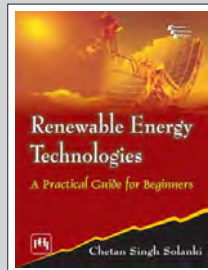




## ENGINEERING

### Mechanical (ENERGY STUDIES)

#### Renewable Energy Technologies: A Practical Guide for Beginners



**CHETAN SINGH SOLANKI**, Associate Professor, Department of Energy Science and Engineering, Indian Institute of Technology Bombay (IITB).

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.

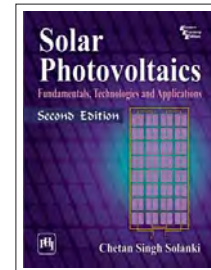
The book helps beginners to understand the basic energy conversion processes involved in various renewable energy based equipment such as solar photovoltaics, solar water heaters, wind turbines, and biomass plants. Under each technology, several possible system configurations and their usages are considered. 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 2013 / 168 pp. / 16.0 × 24.1 cm**  
**ISBN-978-81-203-3434-2 / ₹ 225.00**

#### Solar Photovoltaics: Fundamentals, Technologies and Applications, 2nd ed.



**CHETAN SINGH SOLANKI**, Associate Professor, Department of Energy Science and Engineering, Indian Institute of Technology Bombay (IITB).

This thoroughly revised text, now in its *second 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.

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.

This text is intended for the undergraduate and post-graduate students of engineering for their courses on solar photovoltaic technologies and renewable energy technologies. Besides this, the book will be immensely useful 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. 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. Bibliography. Index.

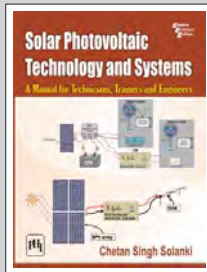
**Latest Print 2013 / 512 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-4386-3 / ₹ 495.00**



## ENGINEERING

### Mechanical (ENERGY STUDIES)

#### Solar Photovoltaic Technology and Systems: A Manual for Technicians, Trainers and Engineers



**CHETAN SINGH SOLANKI**, Associate Professor, Department of Energy Science and Engineering, Indian Institute of Technology Bombay (IITB).

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.

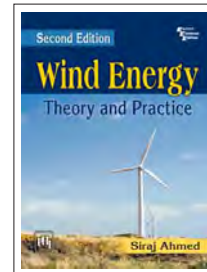
**CONTENTS:** Preface. Acknowledgements. Basics of Electricity. Introduction to Energy and Solar Photovoltaic Energy. Solar Cells. Solar PV Modules. Solar PV Module Arrays. Basics of Batteries. Applications of Batteries in Solar PV Systems. Charge Controller, MPPT and Inverters. Wires. Solar PV System 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



#### 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 2013 / 352 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4490-7 / ₹ 395.00



## ENGINEERING

### Mechanical (ENERGY STUDIES)

#### Wind Power Technology



NEW

**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.

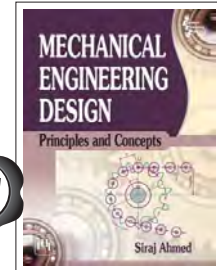
**CONTENTS:** Preface. Renewable Energy Technologies. The Wind Resource. The Wind Power Plant. Wind Energy Conversion. Wind Turbine Aerodynamics. Wind Power Control Strategies. Constant Speed Wind Power Plants. Variable Speed Wind Power Plants. Quality Issues of Wind Power. Grid Integration of Wind Power. Wind Resource Assessment Technologies. Wind Power Plant Design Considerations. Small Wind Turbines. Wind Project Life Cycle. Index.

Latest Print 2014 / 484 pp. / 21.6 × 27.8 cm  
ISBN-978-81-203-4778-6 / ₹ 475.00



### Mechanical (ENGINEERING DESIGN)

#### Mechanical Engineering Design: Principles and Concepts



NEW

**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.

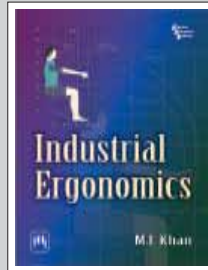
Latest Print 2014 / 576 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4931-5 / ₹ 450.00



## ENGINEERING

### Mechanical (ERGONOMICS)

#### 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.

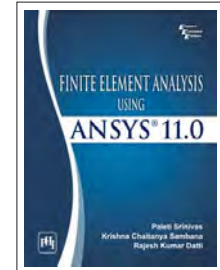
**CONTENTS:** Preface. Introduction. Human Body. Nervous System and Control of Movements. Working Efficiency. Anthropometry and Workplace Design. Heavy Work. Handling Loads. Skilled Work. Man-Machine Systems. Noise and Vibrations. Indoor Climate. Mental Activity. Index.



Latest Print 2014 / 144 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4084-8 / ₹ 150.00

### Mechanical (FINITE ELEMENTS)

#### 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**, 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 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™, 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



## ENGINEERING

### Mechanical (FINITE ELEMENTS)

#### Finite Element Methods: Basic Concepts and Applications



**CHENNAKESAVA R. ALAVALA**, Professor in the Department of Mechanical Engineering, Jawaharlal Nehru Technological University (JNTU), 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 shape functions for higher-order elements.
- Furnishes a large number of worked-out examples and solved problems.

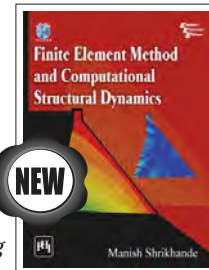
This profusely illustrated, student-friendly text is intended primarily for undergraduate students of Mechanical/Production/Civil and Aeronautical Engineering. By a judicious selection of topics, it can also be profitably used by postgraduate students of these disciplines. In addition, practising engineers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

#### Finite Element Method and Computational Structural Dynamics



**MANISH SHRIKHANDE**, Professor at Department of Earthquake Engineering, Indian Institute of Technology Roorkee, and a member of Indian Society of Earthquake Technology and Earthquake Engineering Research Institute.

Primarily intended for senior undergraduate and postgraduate students of civil, mechanical and aerospace/aeronautical engineering, this text emphasises the importance of reliability in engineering computations and understanding the process of computer aided engineering.

Written with a view to promote the correct use of finite element technology and to present a detailed study of a set of essential computational tools for the practice of structural dynamics, this book is a ready-reckoner for an in-depth discussion of finite element theory and estimation and control of errors in computations. It is specifically aimed at the audience with interest in vibrations and stress analysis. Several worked out examples and exercise problems have been included to describe the various aspects of finite element theory and modelling. The exercise on error analysis will be extremely helpful in grasping the essence of posteriori error analysis and mesh refinement.

#### KEY FEATURES

- Thorough discussion of numerical algorithms for reliable and efficient computation.
- Ready-to-use finite element system and other scientific applications.
- Tips for improving the quality of finite element solutions.
- Companion DVD containing ready to use finite element applications.

**CONTENTS:** Preface. List of Figures. List of Tables. About the CAELinux LiveDVD. Part I: Finite Element Method—Mathematical Modelling, Differential Equations and Approximate Solutions. Finite Elements of One-Dimension. Finite Elements of Two and Three Dimensions. Mapped Elements. Finite Elements for Plates and Shells. Error Analysis and Convergence of Finite Element Solution. The Time Dimension. Part II: Computational Structural Dynamics—Solution of Linear Simultaneous Equations. The Algebraic Eigenvalue Problem. Singular Value Decomposition. Time Marching: Numerical Solution of Initial Value Problems. Discrete Fourier Transform. System Identification: The Inverse Vibration Problem. Model Reduction in Computational Structural Dynamics. Part III: Appendices—A: A Primer on Floating-Point Computations. B: A Primer on Vector Spaces. C: A Primer on Interpolation. D: A Primer on Numerical Quadrature. E: Assembly of Global System of Equations. F: Internet Resources for Scientific Computing. Index.

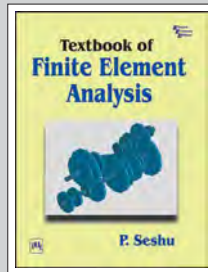
Latest Print 2014 / 484 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4995-7 / 550.00



## ENGINEERING

### Mechanical (FINITE ELEMENTS)

#### 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 Miniproject Topics, B: Review of Preliminaries. C: Typical Finite Element Program. Index.

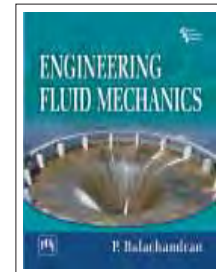
Latest Print 2014 / 340 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-2315-5 / ₹ 275.00



### Mechanical (FLUID MECHANICS)

#### 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



## ENGINEERING

### Mechanical (FLUID MECHANICS)

#### 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).

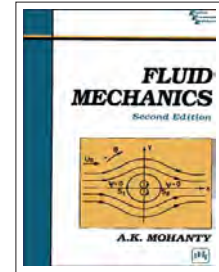
The first part of the book allows the students to review the fundamental theory before stepping into the laboratory environment. The second part enumerates the experimental set-ups, and provides a concluding discussion of each experiment. Appendix A gives various questions based on each experiment to 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



#### Fluid Mechanics, 2nd ed.



**A.K. MOHANTY**, Former Professor, Department of Mechanical Engineering, IIT Kharagpur.

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.

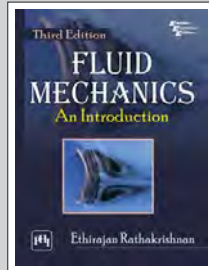
**CONTENTS:** Preface. Preface to the First Edition. Introduction. Fluid Statics. Fluid Kinematics. Analysis of Finite Control Volumes. Mechanical Energy Equation. One-Dimensional Viscous Flow. Dimensional Analysis. Two-Dimensional Flow of Ideal Fluids. Two-Dimensional Viscous Flow. Laminar Boundary 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 2014 / 544 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-0894-7 / ₹ 350.00

## ENGINEERING

### Mechanical (FLUID MECHANICS)

#### 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.

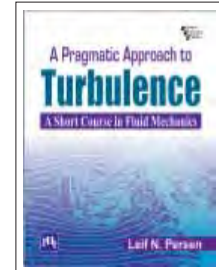
**CONTENTS:** Preface. Preface to the Second Edition. Preface to the First Edition. Some Basic Facts about Fluid Mechanics. Fundamentals of Fluid Mechanics. Dimensional Analysis and Similarity. Boundary Layer. Vortex Theory. Bibliography. Index.

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

**ISBN-978-81-203-4593-5 / ₹ 275.00**



#### 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 analyses free jet flow and shows that the discrepancies that originate from the concept of Reynolds stresses are nonexistent 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. Basic Equations of Turbulent Flow. Closure Problem of Turbulent Flow. Free Turbulence (Jet and Wake Flow). Turbulent Boundary Layer I (Flat Plate). Turbulent Boundary Layer II (The Manipulated Layer). Analysis of Experimental Data. The Thermal Boundary Layer. Fundamental Aspects of Thermal Jets. References. Index.

**Latest Print 2011 / 280 pp. / 17.8 × 23.5 cm**

**ISBN-978-81-203-4092-3 / ₹ 250.00**

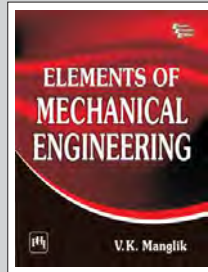




## ENGINEERING

### Mechanical (INTRODUCTORY)

#### Elements of Mechanical Engineering



**V.K. MANGLIK**, *Professor and Head of the Department of Automobile Engineering, Indus Institute of Technology and Engineering, Ahmedabad.*

This book presents a comprehensive introduction to the fundamental principles of mechanical engineering. Beginning with the fundamental concepts of prime mover and different sources of energy, the book clearly explains fuel combustion and the classification of fuels including LPG and CNG. The book discusses the laws of thermo-dynamics and its properties, besides the concepts of entropy and enthalpy. It lays emphasis on the working of various types of cooling systems such as refrigerator and air-conditioning system. The book evaluates the strength of various common engineering materials and their applications.

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

Designed primarily as a text for the first-year undergraduate students of all branches of engineering, this book also meets the requirements of students of AMIE and of diploma level courses.

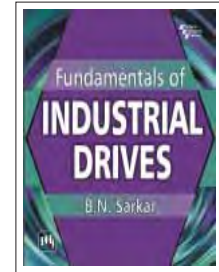
**CONTENTS:** Preface. Introduction. Fuels and Combustion. Properties of Gases. Properties of Steam. Heat Engines. Steam Boilers. Internal Combustion Engines. Speed Control. Pumps. Air Compressor. Refrigeration and Air Conditioning. Coupling, Clutches and Brakes. Transmission of Motion and Power. Important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



Latest Print 2013 / 576 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4629-1 / ₹ 425.00

### Mechanical (MACHINE DESIGN)

#### 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



## ENGINEERING

### Mechanical (MACHINE DESIGN)

#### 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.

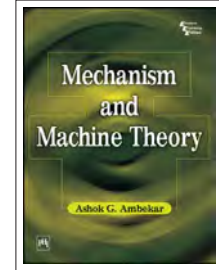
This textbook is designed to appropriately serve the needs of undergraduate and postgraduate students of mechanical engineering, agricultural engineering, and production and industrial engineering for a complete course in Machine Design (Papers I and II), fully conforming to the prescribed syllabi of 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 2012 / 1312 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4517-1 / ₹ 695.00



#### Mechanism and Machine Theory



**ASHOK G. AMBEKAR**, Principal, 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



## ENGINEERING

### Mechanical (MACHINE DRAWING)

#### 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



### Mechanical (MAINTENANCE)

#### Maintenance Engineering and Management, 2nd ed.



**R.C. MISHRA**, Former Director, Aryavart Institute of Technology and Management, Lucknow.

**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



## ENGINEERING

### Mechanical (MAINTENANCE)

### Maintenance and Spare Parts Management, 2nd ed.

**P. GOPALAKRISHNAN** was senior consultant of SQC & TQM in western region of ISI. From 1964–1994, he was senior faculty of spares, materials and maintenance in ASCI. During 1979–1981, he served as United Nations Advisor in Middle East for inventory and spares management. In 1969, Dr. Gopalakrishnan was trained by Harvard Business School (US) as a Ford Foundation Scholar.

**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 2013 / 400 pp. / 15.3 × 22.9 cm  
ISBN-978-81-203-4739-7 / ` 325.00



## ENGINEERING

### Mechanical (MAINTENANCE)

#### Maintenance Engineering and Management



**K. VENKATARAMAN**, faculty 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.

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

### Mechanical (MANUFACTURING PROCESS)

#### Manufacturing Processes, 2nd ed.



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

**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: Smithy 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.

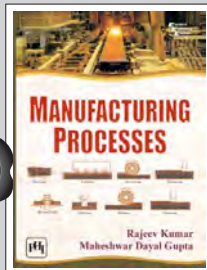
Latest Print 2014 / 1036 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4082-4 / ₹ 525.00



## ENGINEERING

### Mechanical (MANUFACTURING PROCESS)

#### 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

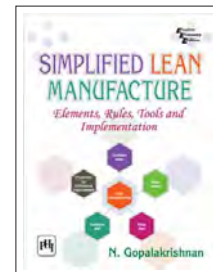
- Suitable examples with short and brief definition of terms for easy understanding.
- Simple language that is easier for the first year students who are not familiar with the difficult technical terms.
- Plenty of figures, schematics and diagrams for better understanding of the related concepts.

**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

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



**N. GOPALAKRISHNAN**, President of Projects India, Bangalore, a company specializing in training and implementing lean manufacture globally. He has trained over 3000 personnel in lean manufacturing and has helped set up 32 plants using the principles of lean manufacture.

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.

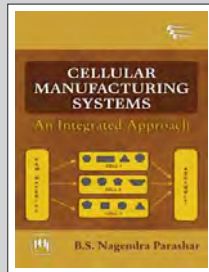
Latest Print 2012 / 248 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3943-9 / ₹ 225.00



## ENGINEERING

**Mechanical** (MANUFACTURING TECHNOLOGY)

### Cellular Manufacturing Systems: An Integrated Approach



**B.S. NAGENDRA PARASHAR**, *Pro Vice Chancellor, K.L. University, Guntur, Andhra Pradesh.*

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.

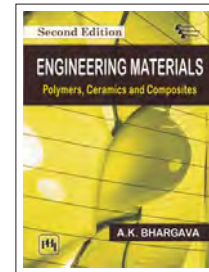
**CONTENTS:** Preface. Cellular Manufacturing: An Overview. Cell Formation Techniques. Processing the Exceptional Components in Cellular Manufacturing. Evaluation of Cellular Manufacturing Solutions. Cell Characteristics. Production Control Activities in Cellular Manufacturing. Implementation Issues 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

**Mechanical** (MATERIALS SCIENCE AND ENGINEERING)

### 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.

**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—Periodic Table of Elements. Some Physical Properties of Metals. The Electronic Configuration of Elements. Atomic and Ionic Radii of Elements. The SI Base Units. Derived SI Units. Unit Conversion. Prefixes: Names of Multiples and Submultiples. Values of Constants. Selective Greek Alphabets and Their Pronunciations. Abbreviations of Commonly Used Polymers. Other Abbreviations. Physical and Thermal Properties of Polymers. Mechanical Properties of Some Representative Polymer Materials. Major ASTM Standards for Polymers. Repeating Chemical Structural Units and Morphology of Polymers. Chemical Composition of Some Ceramic Materials. Some Common Ceramic Crystal Structures and Their Examples. 18: Functions and Applications of Advanced (or Technical) Ceramics. Compositions of Glasses. Compositions of Common Refractories. Properties of Some Commonly Used Reinforcing Fibres. Bibliography. Index.

Latest Print 2013 / 440 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-4621-5 / ₹ 350.00



## ENGINEERING

### Mechanical (MECHANICAL DESIGN)

#### Design of Machine Elements



**C.S. SHARMA**, Formerly, Professor (Mechanical Engineering), Jai Narain Vyas University (JNVs), Jodhpur.

**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.

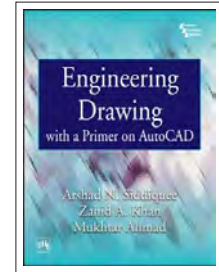
**CONTENTS:** Preface. Introduction to Engineering Design. Computer-Aided Design and Drafting. Engineering Materials. Mechanics of Machine Elements. Fundamentals of Machine Design. Manufacturing and Other Aspects in Design. Design of Joints. Screw Fastenings and Power Screws. Mechanical Springs. Levers. 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 2013 / 780 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-1955-4 / ₹ 450.00



#### 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 / ₹ 250.00



## ENGINEERING

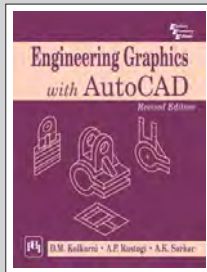
### Mechanical (MECHANICAL DESIGN)

#### 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. Inter-section of Surfaces. Freehand Sketching. Index.

Latest Print 2014 / 344 pp. / 21.6 × 27.8 cm  
ISBN-978-81-203-3783-1 / ` 325.00



#### 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.

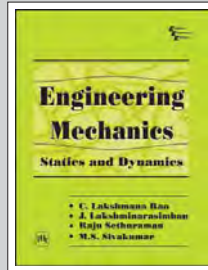
Latest Print 2013 / 736 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4422-8 / ` 495.00



## ENGINEERING

### Mechanical (MECHANICAL DESIGN)

#### 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.

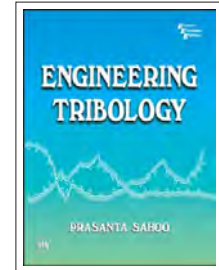
Divided into two parts—*Statics* and *Dynamics*—the text analyzes the equilibrium of structures and the motion of rigid bodies, respectively. It is organized in a structured manner and stresses such important concepts/principles as degrees of freedom, the principle of virtual work (developing it from 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 2011 / 256 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2189-2 / ₹ 195.00

#### 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 nano-tribology 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

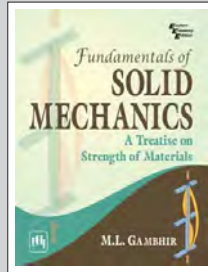


## ENGINEERING

### Mechanical (MECHANICAL DESIGN)

#### 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.

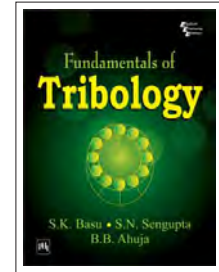
Since the book aims at covering the topics generally taught in engineering curriculum of several disciplines, an interdisciplinary approach has been followed. Some advanced topics such as *thick pressure vessels*, *skew bending*, *curved members*, *beam-columns*, etc. have also been included for the benefit of postgraduate students.

**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

#### 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.

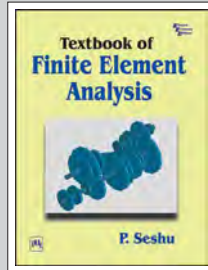
**CONTENTS:** Preface. Introduction. Viscosity of Lubricants and Equation of Hydrodynamics. Surface Roughness and Its Standardization of Measurement Technique. Hydrodynamic Slider Bearings. Hydrodynamic Journal Bearing. Tribological Behaviour of Asperities Contact. Hydrostatic Aerostatic bearings. Elasto 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

## ENGINEERING

### Mechanical (MECHANICAL DESIGN)

#### 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.

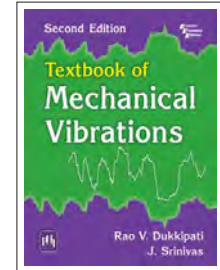
**CONTENTS:** Preface. Introduction. Finite Element Formulation Starting from Governing Differential Equations. Finite Element Formulation Based on Stationarity of a Functional. One-Dimensional Finite Element Analysis. Two-Dimensional Finite Element Analysis. Dynamic Analysis Using Finite Elements. Application 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 / ₹ 275.00



#### 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

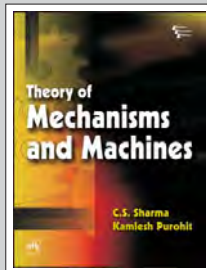
ISBN-978-81-203-4524-9 / ₹ 375.00



## ENGINEERING

### Mechanical (MECHANICAL DESIGN)

#### Theory of Mechanisms and Machines



**C.S. SHARMA**, 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.

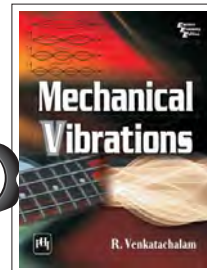
**CONTENTS:** Preface. Introduction to Mechanisms and Machines. Kinematic Analysis of Mechanisms. Synthesis of Mechanisms. Lower Pair Mechanisms. Friction. Belts, Ropes and Chains. Brakes and Dynamometers. Governors. Cams. Gears. Gear Trains. Force Analysis. Balancing. Mechanical Vibrations. Gyroscope.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

Latest Print 2013 / 720 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2901-0 / ₹ 425.00

### Mechanical (MECHANICAL VIBRATIONS/ THEORY OF VIBRATIONS)

#### 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.

**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

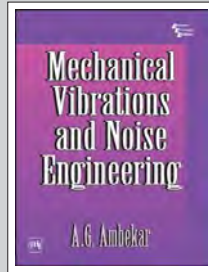


## ENGINEERING

### Mechanical

(MECHANICAL VIBRATIONS/THEORY OF VIBRATIONS)

#### Mechanical Vibrations and Noise Engineering



**A.G. AMBEKAR**, former Professor, Department of Mechanical Engineering, S.G.S. Institute of Technology and Science (SGSITS), Indore (Madhya Pradesh).

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.

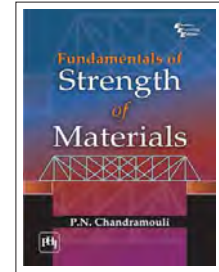
**CONTENTS:** Preface. Fundamentals and Basic Concepts. Undamped Free Vibrations. Damped Free Vibrations. Harmonically Excited Vibration (Systems with Single Degree of Freedom). Systems with Two Degrees of Freedom. Multi-Degree of Freedom Systems. Whirling Motion and Critical Speeds. Continuous Systems. 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 2014 / 412 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2900-3 / ` 325.00

### Mechanical (MECHANICS)

#### 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.

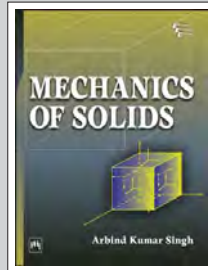
Latest Print 2013 / 864 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-4672-7 / ` 525.00



## ENGINEERING

### Mechanical (MECHANICS)

#### 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 indepth 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

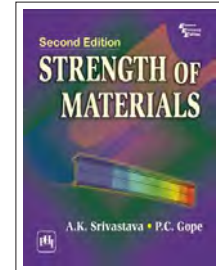
- Elaborate treatment of constitutive relations for linear elasticity.
- Consistent formulation of strength of materials approach and three-dimensional elasticity for bar under axial, bending and torsional deformation.
- Presentation of failure criteria and plasticity theory taking the modern developments 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

#### 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 / 412 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4522-5 / ` 350.00



## ENGINEERING

### Mechanical (OPTIMIZATION)

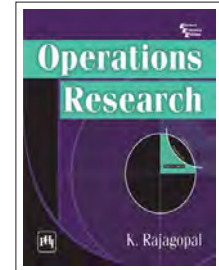
#### Operations Research

**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.

**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**





## ENGINEERING

### Mechanical (OPTIMIZATION)

#### Operations Research, 2nd ed.

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



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, queueing 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. Queueing 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 Exercise Questions. Index.



Latest Print 2013 / 620 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2928-7 / ₹ 350.00

#### Operations Research



**N.K. TIWARI,** *Director, SCOPE Engineering College, Bhopal (Madhya Pradesh). A winner of the Madhya Pradesh Government's Young Scientist Award.*

**SHISHIR K. SHANDILYA,** *Head, Postgraduate Department of Computer Science & Engineering, NRI Institute of Information Science & 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, queueing 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. Queueing 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

## ENGINEERING

### Mechanical (OPTIMIZATION)

#### Operations Research



**NITA H. SHAH**, Reader, Department of Mathematics, Gujarat University, Ahmedabad.

**RAVI M. GOR**, 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 postgraduate 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? Prerequisite 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



PHI Learning: Publications

#### 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.

**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

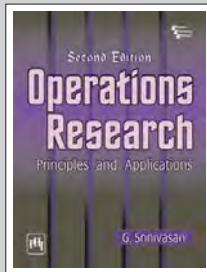
ISBN-978-81-203-3930-9 / 425.00



## ENGINEERING

### Mechanical (OPTIMIZATION)

#### 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 queueing 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.

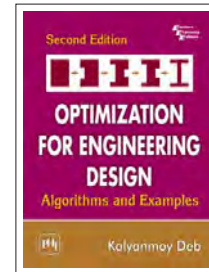
The text is primarily intended for the postgraduate students of management, computer applications, commerce, mathematics and statistics. Besides, the undergraduate students of mechanical engineering and industrial engineering will find this book extremely useful. In addition, this text can also be used 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



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



**KALYANMOY DEB**, Department of Mechanical Engineering, Indian Institute of Technology Kanpur, is a leading researcher in the area of evolutionary computation, particularly in the area of evolutionary multi-objective optimization (EMO).

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. Acknowledgments. Introduction. Single-variable Optimization Algorithms. Multivariable Optimization Algorithms. Constrained Optimization Algorithms. Specialized Algorithms. Nontraditional Optimization Algorithms. Appendix—ApLpeinnedairx Programming Algorithms. References. Problems.

Latest Print 2014 / 440 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-4678-9 / ` 350.00



## Optimization Methods for Engineers

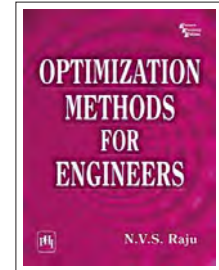
**N.V.S. RAJU**, *Professor and Head, Department of Mechanical Engineering, JNTUH College of Engineering, Nachupally-Kodagattu, Kodimial Mandal, Karimanagar, Andhra Pradesh.*

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.

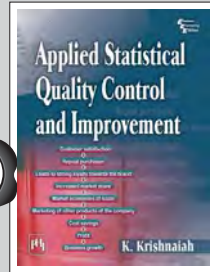
Latest Print 2013 / 616 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4744-1 / ₹ 495.00



## ENGINEERING

### Mechanical (PRODUCTION/INDUSTRIAL)

#### 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

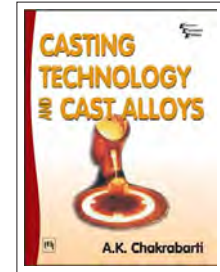
- Provides a well structured procedure for the application of all the tools and techniques.
- Includes Shainin DOE tools widely used in Six sigma projects.
- Demonstrates the application of quality improvement techniques through real life case studies.

**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

#### Casting Technology and Cast Alloys



**A.K. CHAKRABARTI**, *Formerly, Professor, CSIR Emeritus Scientist, 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.

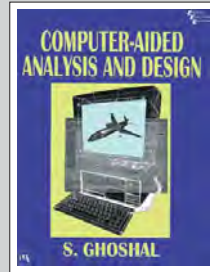
Latest Print 2014 / 268 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2779-5 / ₹ 250.00



## ENGINEERING

Mechanical (PRODUCTION/INDUSTRIAL)

### Computer-Aided Analysis and Design



**S. GHOSHAL**, formerly, Department of Civil Engineering, Birla Institute of Technology and Science, Pilani.

This book is extremely useful to engineering students who wish to increase their efficiency in the usage of computers as a problem solving tool. The text shows how to equip oneself with fundamental techniques of a good user-interface development, such as planning for screen management, usage of peripheral devices like mouse or pen plotter, simple and effective graphics tricks and a few basics of file management. Simulation, Expert Systems, Analytical Tools and DBMS are introduced and discussed with adequate conceptual and software examples.

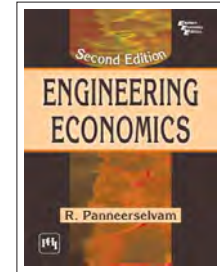
#### KEY FEATURES

- Practical tips for screen management to develop a friendly user-interface.
- Interfacing techniques of peripheral devices such as, Mouse, Printer, CRT, Plotter, etc.
- Subroutines for mouse and plotter interfaces through serial ports and graphics techniques, like moving a cursor without erasing the background, rubber-band technique, etc.
- A complete chapter on simulation, a powerful problem solving tool for engineers.
- Simple engineering examples on Expert Systems and AI.
- A complete case study of a full-length CAAD problem involving real-time data acquisition, simulation, data-processing, storing and presentation of results through screen, printer and plotter.
- Example programs in C, Pascal and Basic.

**CONTENTS:** Preface. Introduction. User Interface. Peripheral Devices. Graphics. File and Directory Management. Simulation. Analytical Tools. Expert Systems. Data Base Management System. A Case Study. Appendix A: A Few Programming and Debugging Tips. Appendix B: Project Bank. Bibliography. Index.

**Latest Print 1997 / 252 pp. / 17.8 × 23.5 cm**  
**ISBN-81-203-1231-7 / ₹ 125.00**

### 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. 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**



## ENGINEERING

### Mechanical (PRODUCTION/INDUSTRIAL)

#### 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.

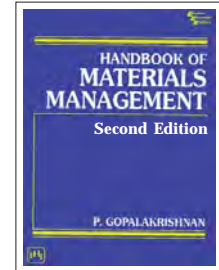
This profusely illustrated, student-friendly text is intended primarily for undergraduate students of Mechanical/Production/Civil and Aeronautical Engineering. By a judicious selection of topics, it can also be profitably used by postgraduate students of these disciplines. In addition, practising engineers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

#### Handbook of Materials Management, 2nd ed.



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

This is an authoritative treatise, a complete guide and a reference book of materials management. It deals with all aspects of materials management including procurement, inventory, warehousing, production logistics, inspection and finance. Summaries in the form of A-Z points appear at the end of each chapter. Probably the only handbook on the *Total Materials Function*, this book is ideal for both practising managers as well as students of Management and Engineering.

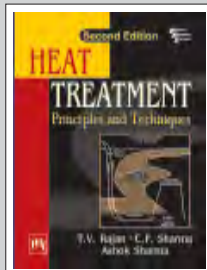
**CONTENTS:** Preface. Part I: Warehousing Management and Logistics—The Warehousing Function. Organising the Warehouse. Location and Layout. Physical Aspects of Warehousing. Safety Measures. Warehouse Operating Systems. Management of Receipts in Stores. Management of Inventory Issues. Warehousing Costs. Linear Programming for Warehousing. Stock Verification. Legal Aspects of Storage. Business Logistics Management. Part II: Cost Reduction Methods—Statistical Aids for Demand Analysis. Forecasting Principles. Codification. Standardisation. The Learning Curve. Value Management. Right Incoming Quality. Waste and Scrap Control. Right Lead Time. Right Packaging. Materials Handling. Mechanised Handling Systems. Transportation Systems. Materials Intelligence System. Computers and Materials Management. Music-3D—20/80 Rule. Part III: Inventory Control—Inventory Basics. Tandon Committee and Chore Group Norms. Right Order Quantity. Quantity and Periodic Inventory Systems. Inventory and MRP. Just in Time Inventory. WIP Inventory. Finished Goods Inventory. Seasonal Inventory. Project Inventory Management. Spare Parts Inventory. Obsolete Inventory. Inventory Simulation. Part IV: Purchasing Strategies—Procurement Strategies. Right Source of Supply. Buyer-Vendor Relations. Supplier Evaluation. Right Pricing. Governmental Buying. Capital Equipment Buying. Contract Management. Legal Aspects. Foreign Purchase. Indigenisation. Art of Negotiations. Part V: Materials Management Policy—Materials-User Interface. Materials-Finance Interface. Make-Buy Decisions. Equipment Leasing. Insurance Management. Claims Management. Pricing of Issues and Stock Valuation. Materials Audit. Human Aspects of Materials Management. Communication and Materials Management. Reporting of Materials Management Activities. Professional Ethics. Evaluation of Materials Management. Part VI: Integrated Policy Case—Ganapathy Ram Petrochemicals. Further Reading. Index.

800 pp. (approx.) / 15.3 × 22.9 cm  
ISBN-978-81-203-4801-1 / FORTHCOMING

## ENGINEERING

### Mechanical (PRODUCTION/INDUSTRIAL)

#### Heat Treatment: Principles and Techniques, 2nd ed.




**T.V. RAJAN, C.P. SHARMA** and **ASHOK SHARMA**  
*all of 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.

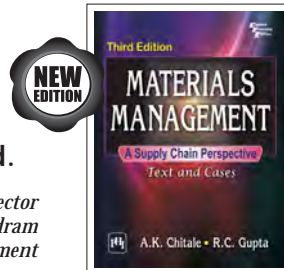
Designed primarily as a text for undergraduate and postgraduate students of Metallurgy, the book is also useful for undergraduate students of mechanical, production, and chemical engineering. Besides, it meets the requirements of students of AMIE/AMIIM, and of diploma level courses in metallurgical and 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 Eco-nomy in Heat Treatment. Appendices. Bibliography. Index.

 **Latest Print 2013 / 408 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-4095-4 / ₹ 375.00**

*PHI Learning: Publications*

#### Materials Management: A Supply Chain Perspective (Text and Cases), 3rd 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 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 postgraduate 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**

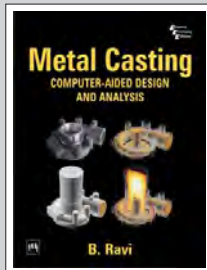




## ENGINEERING

### Mechanical (PRODUCTION/INDUSTRIAL)

#### Metal Casting: Computer-Aided Design and Analysis



**B. RAVI**, Associate Professor of Mechanical Engineering, 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.

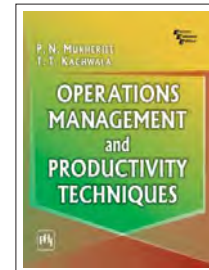
**CONTENTS:** Preface. Metal Casting—Overview. Solid Modelling of Castings. Pattern, Mould, and Core Design. Feeder Design and Analysis. Gating Design and Analysis. Process Planning and Costing. Design for Castability. Appendices. Index.

Latest Print 2013 / 168 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-2726-9 / ₹ 225.00



#### 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 2009 / 432 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3602-5 / ₹ 325.00

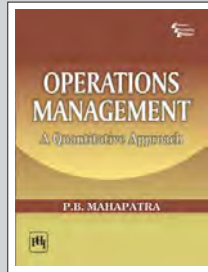


## ENGINEERING

### Mechanical (PRODUCTION/INDUSTRIAL)

#### 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.

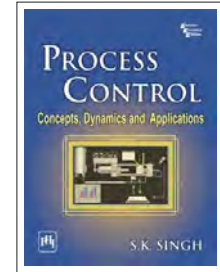
**CONTENTS:** Preface. Management of Production Systems. PART I—Linear Programming, Transportation and Assignment Models. Dynamic Optimization Models. Waiting Lines Models. PART II—Product Design and Development. Forecasting. Capacity Analysis. Facility Location and Layout. Balancing of Assembly Lines. 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

PHI Learning: Publications

#### 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.

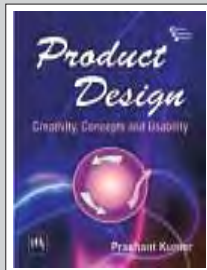
Latest Print 2012 / 748 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3678-0 / ₹ 450.00



## ENGINEERING

Mechanical (PRODUCTION/INDUSTRIAL)

### 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

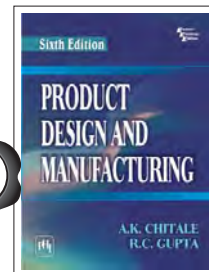
- Many examples of products from day-to-day life.
- Concept explanation using case studies and anecdotes.
- Discussions on philosophical, creative, and conceptual aspects of design process.

**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



### 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.

**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



## ENGINEERING

### Mechanical (PRODUCTION/INDUSTRIAL)

#### Production Planning and Control: Text and Cases, 2nd ed.

**S.K. MUKHOPADHYAY**,  
formerly, Professor, National  
Institute of Industrial  
Engineering, Mumbai.



This comprehensive and up-to-date text, now in its Second 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 on industrial organizations for better quality of services, 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 as much emphasis on the principles of heuristic techniques as on the systematic approach to production planning.

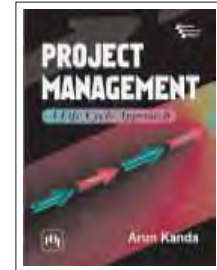
This book would serve as a useful textbook to post-graduate students of management as well as undergraduate students of industrial engineering. It will be equally useful to the teaching community and the practicing professionals.

**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. References. Suggested Further Reading. Index.

Latest Print 2013 / 392 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-3118-1 / ₹ 325.00

#### 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.

**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.

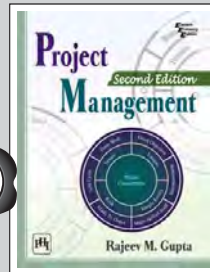
Latest Print 2013 / 240 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-4173-9 / ₹ 225.00



## ENGINEERING

### Mechanical (PRODUCTION/INDUSTRIAL)

#### Project Management, 2nd ed.



**RAJEEV M. GUPTA** a Project Consultant, is a Visiting Faculty at various B-Schools-SGSITS, IMS, PIMR, and Jaipuria institute. Mr. Gupta has also worked as full time faculty at SGSITS, Indore.

The Second Edition of this comprehensive book, discusses the fundamental aspects of Project Management in a student-friendly manner. It deals with topics such as project life cycle, project selection, feasibility study and techniques like PERT and CPM for project control. Various methods such as Hiller model, sensitivity analysis and simulations are described with hypothetical numerical examples to evaluate risk.

A new chapter on *International Aspects of Project Management* is added to provide the knowledge of project management at international level. Several new case studies have also been added to provide better learning of the various concepts of the subject. Besides these, most of the chapters have been updated with new figures and more practical problems.

Primarily designed for the undergraduate and postgraduate students of management and engineering (industrial and civil engineering), the book will be equally useful to the practicing professionals of project management.

#### KEY FEATURES OF THE BOOK

- Includes algorithms for crashing and resource leveling.
- Provides a new method for determining marketing feasibility.
- Describes quantitative methodology for evaluating risk.

**CONTENTS:** Preface. Introduction. Project Life Cycle and Its Classification. Project Management Process and Project Selection. Technical Feasibility. Market Potential Analysis. Financial Projections. Project Financing. Financial Analysis. Risk Analysis in Single and Multiple Projects. Project Control through Networks. Probabilistic Models of Networks. Time-Cost Relationship and Resource Levelling. Economic and Social Cost Benefit Analysis. Human Aspects in Project Management. Project Information System and Monitoring. International Project Management. Appendix A: The Standard Normal Probability Distribution. Appendix B: Financial Tables. Bibliography. Index.

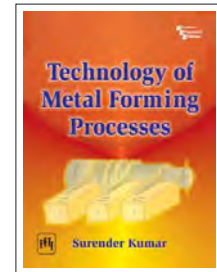
Latest Print 2014 / 368 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4940-7 / 325.00



#### 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

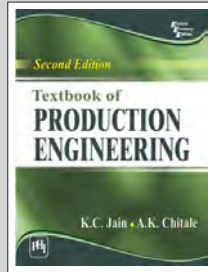


## ENGINEERING

### Mechanical (PRODUCTION/INDUSTRIAL)

#### 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 / 916 pp. / 17.8 × 23.5 cm

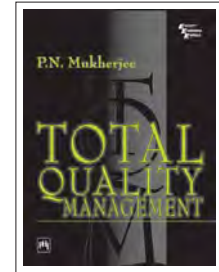
ISBN-978-81-203-4749-6 / ₹ 695.00



PHI Learning: Publications

#### Total Quality Management

**P.N. MUKHERJEE**, Professor  
and Chairperson, Total Quality  
Management and Supply Chain  
Management, Narsee Monjee  
Institute of Management &  
Higher Studies (Deemed  
University), Mumbai.



This book presents a comprehensive view of concepts, principles and practices of Total Quality Management (TQM) from basics through advanced tools and techniques for practical implementation.

It is well known that 'Total Organization Involvement' in understanding and implementing TQM, along with the integrated business strategy, provided Japanese organizations with a strong platform for a meteoric rise to world-class performance and global leadership in every sphere of their operation. The success of TQM therefore depends a lot on the strong foundation and infrastructure of an organization. This is the crux of the author's theory of 'Holistic Management System for World-class Performance and Leadership' expounded in this book. It is a TQM-based model that helps create a world-class management system for performance excellence and global leadership.

The concluding part of the book cites several examples of practical implementation of TQM principles and practices in various manufacturing and service sectors of the Indian industry, providing elaboration and analysis of each case study.

The book is aimed at undergraduate and postgraduate students of management as well as students of most engineering disciplines. It can also be used by the industries as a valuable guide to continuous improvement and implementation of a world-class management system in line with the TQM principles and practices.

In a nutshell, the book provides wide coverage of areas related to TQM and integrates all its processes, tools and techniques under one management system to help businesses grow and excel. This is indeed the *unique* feature of the book.

**CONTENTS:** Preface. Introduction to Total Quality Management, Management of Process/Operation and Customer Satisfaction. Total Quality Management System—Its Various Concepts and Tools. Total Quality Management Practices. Holistic Management System for World-class Performance and Leadership. Foundation. Infrastructure. Holistic Quality Management. Results. Statistical Process Control. Six Sigma. Various TQM Related Tools and Concepts. Case Studies. Bibliography. Index.

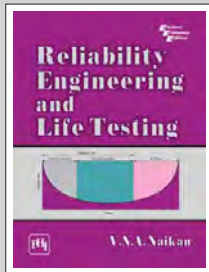
Latest Print 2014 / 432 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3056-6 / ₹ 350.00

## ENGINEERING

### Mechanical (RELIABILITY ENGINEERING)

#### 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

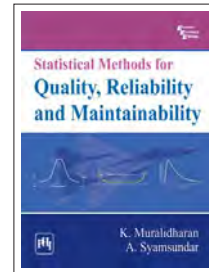
- The book is up-to-date and very much relevant to the present industrial, research, design, and development scenarios.
- Provides adequate tools to predict the system reliability at the design stage, to plan and conduct life testing on the products at various stages of development, and to use the life 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

#### Statistical Methods for Quality, Reliability and Maintainability



**K. MURALIDHARAN**, Professor and Head, Department of Statistics, The Maharaja Sayajirao University of Baroda, Vadodra. 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 post-graduate 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.

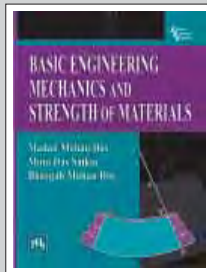
**Latest Print 2012 / 360 pp. / 17.8 × 23.5 cm**  
ISBN-978-81-203-4543-0 / 350.00



## ENGINEERING

### Mechanical (THERMAL)

#### 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**, Contract-Engineering Manager & Chairperson, Green Building Section, RITTA Co. Ltd., Bangkok.

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. The text also discusses analysis of forces in space and perfect frames, centre of gravity, friction and kinetics of rigid bodies. In **Part II**, it focuses on elementary knowledge of Strength of Materials (Chapters 12–17). The coverage of strength of materials comprises 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 2010 / 272 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4181-4 / ₹ 225.00

PHI Learning: Publications

#### 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 2013 / 512 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3845-6 / ₹ 325.00

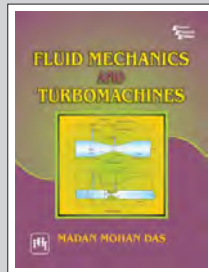




## ENGINEERING

### Mechanical (THERMAL)

#### 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.

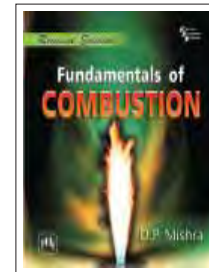
#### KEY FEATURES

- 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**

#### Fundamentals of Combustion, Revised Edition



**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.

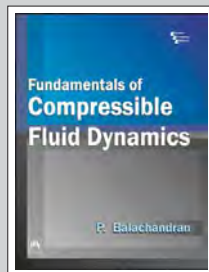
**Latest Print 2013 / 280 pp. / 17.8 × 23.5 cm**  
**ISBN-978-81-203-3348-2 / ₹ 275.00**



## ENGINEERING

### Mechanical (THERMAL)

#### Fundamentals of Compressible Fluid Dynamics



**P. BALACHANDRAN**, *Senior Scientist and Deputy Divisional Head of Liquid Propulsion Systems Centre (LPSC) of Indian Space Research Organisation (ISRO), Thiruvananthapuram, Kerala.*

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.

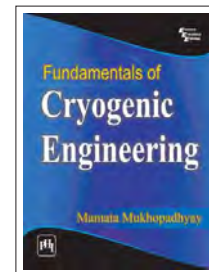
**CONTENTS:** Preface. Fundamental Principles. Conservation Laws for Compressible Flow. Concepts of Compressible Flow. Isentropic Flow. Fanno Flow. Rayleigh Flow. Simple Flow with Mass Addition. Generalised One-Dimensional Flow. Normal Shock Waves. Oblique Shock Waves. Flow through Nozzles and Diffuser. 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



PHI Learning: Publications

#### Fundamentals of Cryogenic Engineering



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

Intended as a text for the undergraduate and postgraduate 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 cryo-temperatures.
- 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

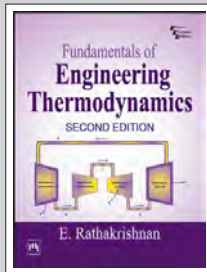


## ENGINEERING

### Mechanical (THERMAL)

#### 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

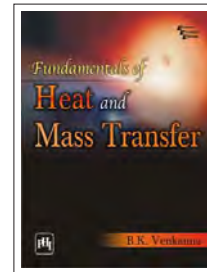
- Devotes separate chapters to treatment of statistical thermodynamics and kinetic theory of ideal gases
- Includes a revised chapter on heat transfer theory
- Provides systematic problem-solving methodology to fortify material throughout
- End-of-chapter summaries help students identify key concepts
- 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 2013 / 716 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2790-0 / ₹ 425.00

#### Fundamentals of Heat and Mass Transfer



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

This comprehensive text on the basics of heat and mass transfer theory provides a solid introduction to 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 solving problems, this text is written to meet the needs of undergraduate students in mechanical engineering, production engineering, industrial engineering, automobile engineering, and aeronautical engineering.

#### 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 2010 / 508 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4031-2 / ₹ 395.00

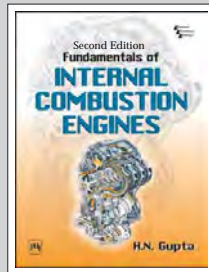


## ENGINEERING

### Mechanical (THERMAL)

#### Fundamentals of Internal Combustion Engines, 2nd ed.

**H.N. GUPTA**, *Professor of Mechanical Engineering at the 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.

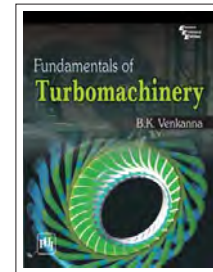
**CONTENTS:** Preface. Introduction to Internal Combustion Engines. Air-Standard Cycles and Their Analysis. Reactive Systems. Fuel-Air Cycles and Their Analysis. The Actual Cycle. Combustion in Spark-Ignition Engines. Combustion in Compression-Ignition Engines. Fuels for Internal Combustion Engines. Carburetors and Fuel Injection in SI Engines. CI Engines: Fuel-Injection System. Two-Stroke Engine. 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. Index.



Latest Print 2014 / 676 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4680-2 / ₹ 525.00

PHI Learning: Publications

#### Fundamentals of Turbomachinery



**B.K. VENKANNA**, *Professor of Mechanical Engineering at Sri Basaveshwar Engineering College, Bagalkot, 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 / 646 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3775-6 / ₹ 425.00



## ENGINEERING

### Mechanical (THERMAL)

#### Gas Dynamics, 5th ed.

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

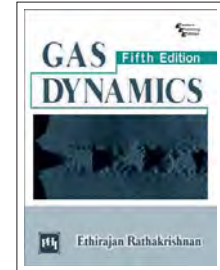
This revised and updated fifth edition continues to provide the most accessible and readable approach to the study of all the vital topics and issues associated with gas dynamic processes. At every stage, the physics governing the process, its applications and limitations are discussed in depth.

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.

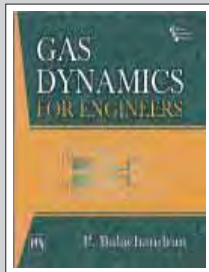
Latest Print 2013 / 548 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-4839-4 / ` 475.00



## ENGINEERING

### Mechanical (THERMAL)

#### Gas Dynamics for Engineers



**P. BALACHANDRAN**, *Senior Scientist and Head of Propulsion Research Division at the Liquid Propulsion Systems Centre, Indian Space Research Organisation 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-organized 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 through extensive use of line drawings.
- Contains a large number of solved illustrative examples to help comprehend the concepts with ease.
- Includes review questions to test students comprehensive of the subject.
- Provides answers to unsolved problems.
- Presents flow tables in appendices.

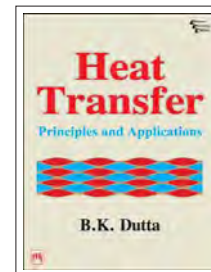
**CONTENTS:** Preface. Basic Laws and Concepts. Isentropic Flow. Fanno Flow. Rayleigh Flow. Simple Flow with Mass Addition. Normal Shock Waves. Oblique Shock Waves. Flow Through Nozzles and Diffusers. Measurements in Compressible Flow. Appendices—A1: Isentropic Flow Table ( $\gamma = 1.4$ ). A2: Fanno 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 2011 / 320 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4021-3 / ₹ 295.00



#### Heat Transfer: Principles and Applications



**BINAY K. DUTTA**, *Professor in Chemical Engineering Department of Universiti Teknologi Petronas, Malaysia.*

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 2014 / 544 pp. / 17.8 × 23.5 cm

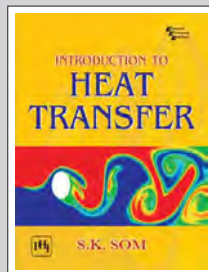
ISBN-978-81-203-1625-6 / ₹ 350.00

## ENGINEERING

### Mechanical (THERMAL)

#### Introduction to Heat Transfer

**S.K. SOM**, *Professor in the department of mechanical engineering at the Indian Institute of Technology Kharagpur and currently the Dean of Academic Affairs (undergraduate studies).*



This book presents a comprehensive treatment of the essential fundamentals of the topics that should be taught as the first-level course in Heat Transfer to the students of engineering disciplines. The theoretical content is well balanced with the problem-solving methodology necessary for developing an orderly approach to solving a variety of engineering problems. The book provides adequate mathematical rigour to help students achieve a sound understanding of the physical processes involved.

#### KEY FEATURES

- A well-balanced coverage between analytical treatments, physical concepts and practical demonstrations.
- Analytical descriptions of theories pertaining to different modes of heat transfer by the application of conservation equations to control volume and also by the application of conservation equations in differential form like continuity equation, Navier–Stokes equations and energy equation.
- A comprehensive description of the principles of convective heat transfer based on mathematical foundation of fluid mechanics with generalized analytical treatments.
- A separate chapter describing the basic mechanisms and principles of mass transfer showing the development of mathematical formulations and finding the solution of simple mass transfer problems.
- A summary at the end of each chapter to highlight key terminologies and concepts and important formulae developed in that chapter.
- A number of worked-out examples throughout the text, review questions, and exercise problems (with answers) at the end of each chapter.

This book is appropriate for a one-semester course in Heat Transfer for undergraduate engineering students pursuing careers in mechanical, metallurgical, aerospace and chemical disciplines.

**CONTENTS:** Preface. Fundamental Concepts. One-dimensional Steady-state Heat Conduction. Multidimensional Steady-state Heat Conduction. Unsteady Conduction. Convection. Incompressible Viscous Flow: A Brief Review. 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. Appendices. Index.

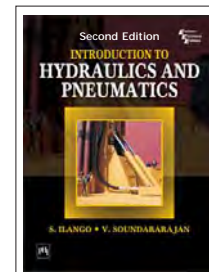
Latest Print 2013 / 572 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3060-3 / ₹ 495.00



#### 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.

**CONTENTS:** Preface. Preface to the First Edition. Abbreviations. Part I: HYDAULICS—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 HYDAULICS AND PNEUMATICS—Servo System. PLC Applications in Fluid Power. Failure and Troubleshooting in Fluid Power Systems. Part IV: APPENDICES: 1. Terminologies Used in Fluid Power. 2. Hydraulic Symbols. 3. Useful Data and Units. 4. Multiples and Submultiples. 5. Hydraulic Fluid Characteristics. 6. Standard and Popular Bore and Rod Diameters of Hydraulic Cylinders. 7. Popular Symbols Used in Pneumatic Circuits. 8. Solutions to Selected Pneumatic/Electropneumatic Circuit Problems. Bibliography. Index.

Latest Print 2013 / 308 pp. / 17.8 × 23.5 cm

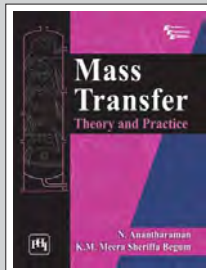
ISBN-978-81-203-4406-8 / ₹ 295.00



## ENGINEERING

### Mechanical (THERMAL)

#### 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

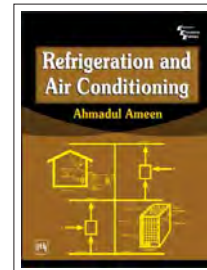
1. Explains the theoretical concepts with full derivation of equations.
2. Illustrates the application of theory through worked-out numerical examples.
3. Provides exercise problems with answers at the end of each chapter for practice.

**CONTENTS:** Foreword. Preface. Acknowledgements. Introduction to Mass Transfer. Diffusion. Mass Transfer Coefficient and Interphase Mass Transfer. Equipments for Gas—Liquid Operating. Humidification. Drying. Crystallisation. 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

PHI Learning: Publications

#### Refrigeration and Air Conditioning



**AHMADUL AMEEN**,  
*Professor of Mechanical Engineering at the Universiti Sains Malaysia. He received his Master's degree in mechanical engineering from the University of Strathclyde, Glasgow.*

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.

This text incorporates ASHARE tables and charts so that the students are exposed to solving real-life design problems.

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.

**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: Multipressure 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



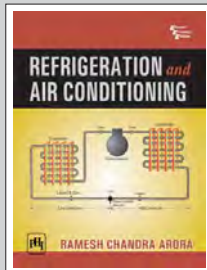


## ENGINEERING

### Mechanical (THERMAL)

#### Refrigeration and Air Conditioning

**RAMESH CHANDRA ARORA,**  
*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.

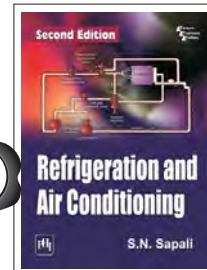
**CONTENTS:** Preface. Acknowledgements. History of Refrigeration. Thermal Principles—A Review of Fundamentals. Mechanical Vapour Compression Cycles. Compressors. Performance of Single Stage Saturation Cycle with Reciprocating Compressor. Multistage Refrigeration Systems. Absorption Refrigeration Systems. 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 2012 / 1096 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3915-6 / 525.00

#### 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 postgraduate students of mechanical engineering, automobile engineering as well as chemical engineering.

The text commences with an introduction to the fundamentals of thermodynamics 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.

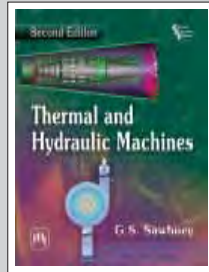
Latest Print 2014 / 592 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4872-1 / 425.00



## ENGINEERING

### Mechanical (THERMAL)

#### Thermal and Hydraulic Machines, 2nd ed.



**G.S. SAWHNEY**, Professor and Head, Department of Mechanical Engineering, 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.

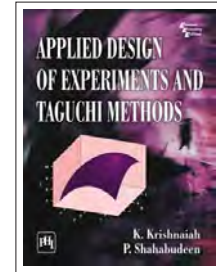


Latest Print 2014 / 588 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4473-0 / ` 495.00

PHI Learning: Publications

### Mechanical (TOTAL QUALITY MANAGEMENT)

#### Applied Design of Experiments and Taguchi Methods



**K. KRISHNAIAH**, Former Professor and Head, 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 post-graduate 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.

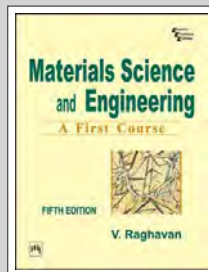
Latest Print 2013 / 376 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4527-0 / ` 395.00



## ENGINEERING

### Metallurgy/Material Science (BASIC METALLURGICAL SCIENCE)

#### Materials Science and Engineering: A First Course, 5th ed.



**V. RAGHAVAN**, Formerly, Professor of Materials Science, 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 and widely adopted book, now in its Fifth 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 good 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 last four chapters are devoted to a detailed description of electrical conduction, superconductivity, semiconductors, and magnetic and dielectric properties.

This highly accessible 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 skilful use of clear-cut diagrams, illustrative tables, worked-out examples, and in many other ways. It is a **must-have book** for all engineering and applied science students.

**CONTENTS:** Preface. SI Units. Physical Constants. Conversion Factors. 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. Appendices I & II. Index.

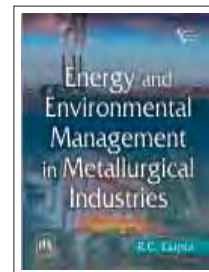
Latest Print 2013 / 464 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-2455-8 / 250.00



### Metallurgy/Material Science (ENERGY AND ENVIRONMENT MANAGEMENT)

#### Energy and Environmental Management in Metallurgical Industries



**R.C. GUPTA**, former Professor in Metallurgy and Head, Department of Metallurgical Engineering, IIT-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



## ENGINEERING

### Metallurgy/Material Science (EXTRACTIVE METALLURGY)

#### 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.

**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.

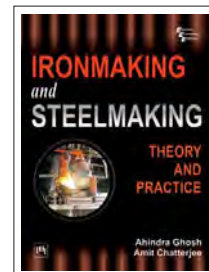
Latest Print 2014 / 280 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4947-6 / 350.00



PHI Learning: Publications

#### Ironmaking and Steelmaking: Theory and Practice

**AHINDRA GHOSH**, Formerly Professor, Materials and Metallurgical Engineering, Indian Institute of Technology Kanpur.



**AMIT CHATTERJEE**, Formerly Chief Technology Officer, Currently Adviser to the Managing Director, Tata Steel Limited, Jamshedpur.

This authoritative account covers the entire spectrum from iron ore to finished steel. 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.

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.

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



## ENGINEERING

### Metallurgy/Material Science (EXTRACTIVE METALLURGY)

#### Sponge Iron Production by Direct Reduction of Iron Oxide, 2nd ed.



**AMIT CHATTERJEE**, Formerly Chief Technology Officer, Currently Adviser to the Managing Director, Tata Steel Limited, Jamshedpur.

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.

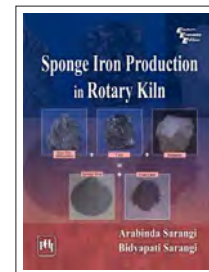
**CONTENTS:** Preface. Common Terminologies Used in This Book. The Need for Alternative Iron Units. Scrap: Type, Availability and Demand. Fundamentals of Direct Reduction. Coal-based DR Processes Using Rotary Kilns. Coal-based Processes Using Reactors Other Than Rotary Kiln. Gas-based Direct Reduction. 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



#### Sponge Iron Production in Rotary Kiln



**ARABINDA SARANGI**, Director (Academics), Synergy Institute of Engineering and Technology, Banamali Prasad, Dhenkanal.

**BIDYAPATI SARANGI**, Professor, Department of Metallurgical and Materials Engineering, Indira Gandhi Institute of Technology (IGIT), Sarang, 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. This book comprehensively deals with the production of sponge iron in the rotary kiln.

The book is divided into 17 chapters. The initial chapters give a brief on the fundamental theories and basic principles of sponge iron production, commercially used DR (direct reduction) processes and physico-chemical principles of sponge iron production. The book then goes on elucidating the testing procedures of raw materials needed for the direct reduction processes. The testing includes iron ore testing, thermal disintegration testing, reducibility testing, and swelling and bed permeability testing.

Further, it details on the reduction of iron oxide inside the rotary kiln. The entire rotary kiln plant and its functionalities are explained with precision. The concluding chapters explicate the ways to store and handle sponge iron. The heat and mass balance calculation done meticulously shows how the waste heat can be utilized for power generation. This heat balance calculation is very much useful while designing the furnace and in determining fuel efficiency.

**CONTENTS:** Preface. Acknowledgements. Background. Commercially Used DR Processes. Physico Chemical Principle of Sponge Iron Production. Raw Materials for DRI Production. Testing Procedures for the Determination of Metallurgical Characteristics of Feed Materials. 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. Heat and Mass Balance. Utilization of Sponge Iron. Appendices. Index.

Latest Print 2011 / 288 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4099-2 / ` 275.00

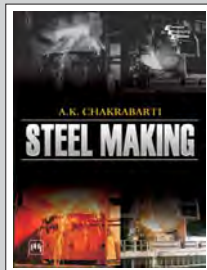


## ENGINEERING

**Metallurgy/Material Science (EXTRACTIVE METALLURGY)**

### Steel Making

**A.K. CHAKRABARTI**,  
former Professor of Metallurgical  
& Materials Engineering at the  
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.



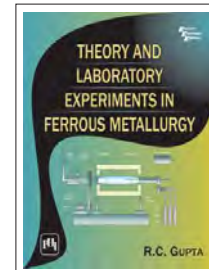
Latest Print 2014 / 240 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-3050-4 / ₹ 295.00

PHI Learning: Publications

**Metallurgical/Materials Engineering  
(FERROUS METALLURGY)**

### Theory and Laboratory Experiments in Ferrous Metallurgy

**R.C. GUPTA** is engaged in  
teaching and research in the field of  
Ferrous Metallurgy for more than  
four decades at Banaras Hindu  
University.



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 2010 / 344 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3924-8 / ₹ 325.00



## ENGINEERING

### Metallurgical/Materials Engineering (FOUNDRY)

#### Casting Technology and Cast Alloys



**A.K. CHAKRABARTI**, Formerly, Professor, CSIR Emeritus Scientist, 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.

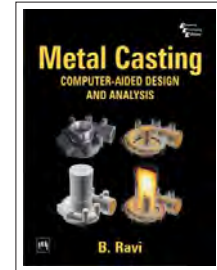
The book is primarily designed for degree and diploma students pursuing courses in metallurgical, mechanical, and production engineering disciplines as well as for candidates studying for Associate Membership Examinations (AMIIME, AMIE, Grad. IIF). It would also benefit M.Tech./M.E. students specializing 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

#### Metal Casting: Computer-Aided Design and Analysis



**B. RAVI**, Associate Professor of Mechanical Engineering, 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.

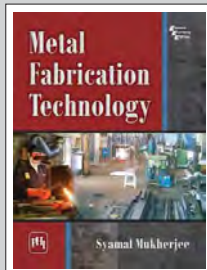
Latest Print 2013 / 168 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2726-9 / ₹ 225.00



## ENGINEERING

**Metallurgy/Material Science (MANUFACTURING PROCESSES)**

### 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.

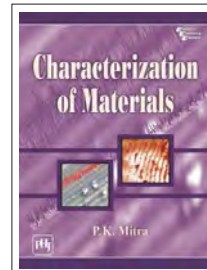


Latest Print 2010 / 468 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4090-9 / ₹ 425.00

PHI Learning: Publications

**Metallurgy/Material Science (PHYSICAL METALLURGY)**

### 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

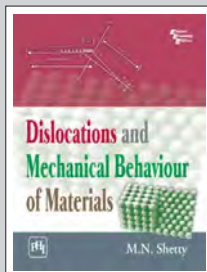




## ENGINEERING

### Metallurgy/Material Science (PHYSICAL METALLURGY)

#### 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.

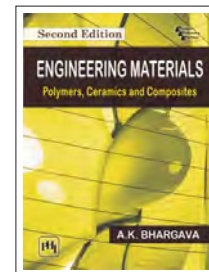
Primarily intended for the senior undergraduate and postgraduate students of Metallurgical and Materials Engineering/Mechanical Engineering, the book begins with the description of elementary mechanical testing method and then moves on to the theory of elasticity, the micro-mechanics of high strain rate 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

#### 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.

**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—Periodic Table of Elements. Some Physical Properties of Metals. The Electronic Configuration of Elements. Atomic and Ionic Radii of Elements. The SI Base Units. Derived SI Units. Unit Conversion. Prefixes: Names of Multiples and Submultiples. Values of Constants. Selective Greek Alphabets and Their Pronunciations. Abbreviations of Commonly Used Polymers. Other Abbreviations. Physical and Thermal Properties of Polymers. Mechanical Properties of Some Representative Polymer Materials. Major ASTM Standards for Polymers. Repeating Chemical Structural Units and Morphology of Polymers. Chemical Composition of Some Ceramic Materials. Some Common Ceramic Crystal Structures and Their Examples. 18: Functions and Applications of Advanced (or Technical) Ceramics. Compositions of Glasses. Compositions of Common Refractories. Properties of Some Commonly Used Reinforcing Fibres. Bibliography. Index.

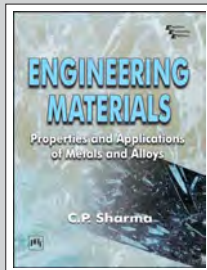
Latest Print 2012 / 440 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-4621-5 / ₹ 350.00



## ENGINEERING

### Metallurgy/Material Science (PHYSICAL METALLURGY)

#### Engineering Materials: Properties and Applications of Metals and Alloys



**C.P. SHARMA**, Professor, Department of Metallurgical Engineering, Malviya 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 2013 / 272 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-2448-0 / ` 225.00

#### Heat Treatment: Principles and Techniques, 2nd ed.



**T.V. RAJAN, C.P. SHARMA** and **ASHOK SHARMA** all of 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.

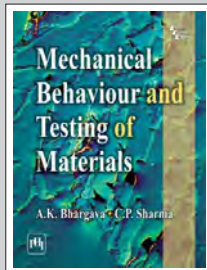
Latest Print 2013 / 408 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4095-4 / ` 375.00



## ENGINEERING

### Metallurgy/Material Science (PHYSICAL METALLURGY)

#### 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.

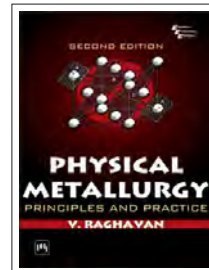
#### KEY FEATURES

- **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**

#### Physical Metallurgy: Principles and Practice, 2nd ed.



**V. RAGHAVAN**, Formerly, Professor of Materials Science, 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**



## ENGINEERING

**Metallurgy/Material Science (PHYSICAL METALLURGY)**

### Solid State Phase Transformations



**V. RAGHAVAN**, Formerly, Professor of Materials Science, 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.

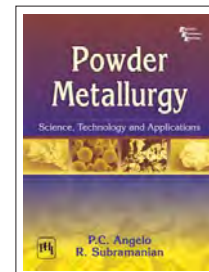
The book is intended for advanced level undergraduate students of metallurgy and materials science, first year postgraduate students of metallurgy and materials science, and M.Sc. students of solid-state physics and solid-state chemistry.

**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**

**Metallurgy/Material Science (POWDER METALLURGY)**

### 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.

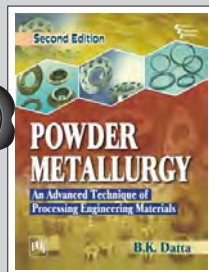
**CONTENTS:** Foreword. Preface. Powder Metallurgy: Basic Steps. Production of Powders. Powder Treatment and Handling. Metal Powder Characteristics. Compaction of Metal Powders. High-Temperature Compaction. Sintering. Postsintering Operations. Powder Metallurgy Products. Advanced Powder Metallurgical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

**Latest Print 2012 / 312 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-3281-2 / ₹ 325.00**

## ENGINEERING

### Metallurgy/Material Science (POWDER METALLURGY)

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



**B.K. DATTA** is 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.

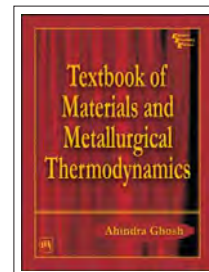


Latest Print 2014 / 232 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-4942-1 / ₹ 295.00

### Metallurgy/Material Science

(THERMODYNAMICS AND ENGINEERING MATERIALS)

**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.

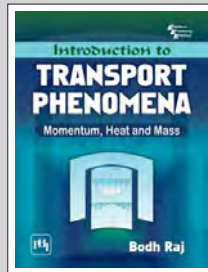
Latest Print 2014 / 300 pp. / 17.8 × 23.5 cm  
ISBN-978-81-203-2091-8 / ₹ 250.00

## ENGINEERING

### Metallurgy/Material Science (TRANSPORT PHENOMENA)

#### Introduction to Transport Phenomena: Momentum, Heat and Mass

**BODH RAJ**, *Professor in Chemical Engineering.*



This introductory text discusses the essential concepts of three fundamental transport processes, namely, momentum transfer, heat transfer, and mass transfer. Apart from chemical engineering, transport processes play an increasingly important role today in the fields of biotechnology, nanotechnology and microelectronics.

The book covers the basic laws of momentum, heat and mass transfer. All the three transport processes are explained using two approaches—first by flux expressions and second by shell balances. These concepts are applied to formulate the physical problems of momentum, heat and mass transfer. Simple physical processes from the chemical engineering field are selected to understand the mechanism of these transfer operations. Though these problems are solved for unidirectional flow and laminar flow conditions only, turbulent flow conditions are also discussed. Boundary conditions and Prandtl mixing models for turbulent flow conditions are explained as well. The unsteady-state conditions for momentum, heat and mass transfer have also been highlighted with the help of simple cases.

Finally, the approach of analogy has also been adopted in the book to understand these three molecular transport processes. Different analogies such as Reynolds, Prandtl, von Kármán and Chilton–Colburn are discussed in detail.

This book is designed for the undergraduate students of chemical engineering and covers the syllabi on **Transport Phenomena** as currently prescribed in most institutes and universities.

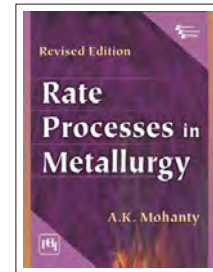
**CONTENTS:** Preface. Introduction to Transport Phenomena. Section A: Momentum Transfer—Momentum Transport. Shell Momentum Balances and Velocity Distribution in Laminar Flow Conditions (Typical Cases). Equations of Change for Isothermal System. Momentum Transfer in Turbulent Flow. Unsteady-state Flow of Newtonian Fluids. Section B: Heat Transfer—Heat Transfer. Shell Energy Balances and Temperature Distribution in Heat Conduction in Solids (Typical Cases). The General Energy Equation. Temperature Distribution in Turbulent Flow. Unsteady-state Heat Conduction in a Semi-infinite Slab. Section C: Mass Transfer—Mass Transfer. Shell Mass Balances and Concentration Distribution for Laminar Flow. The General Equation of Diffusion. Concentration Distribution in Turbulent Flow. Unsteady-state Evaporation of a Liquid. Section D: Analogy—Analogy. Appendices. Index.

Latest Print 2012 / 240 pp. / 16.0 × 24.1 cm  
ISBN-978-81-203-4518-8 / ₹ 225.00



PHI Learning: Publications

#### 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.

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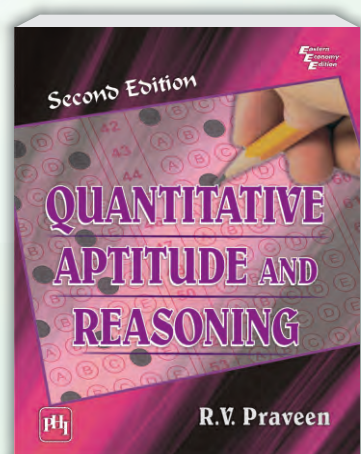
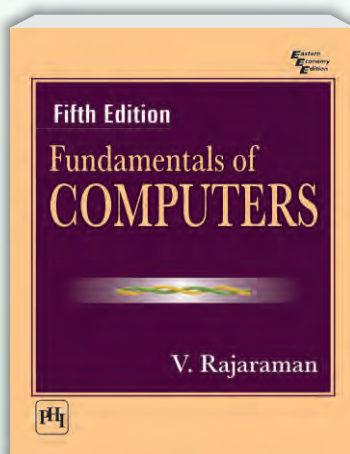
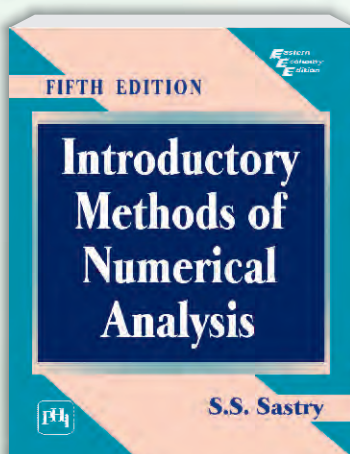
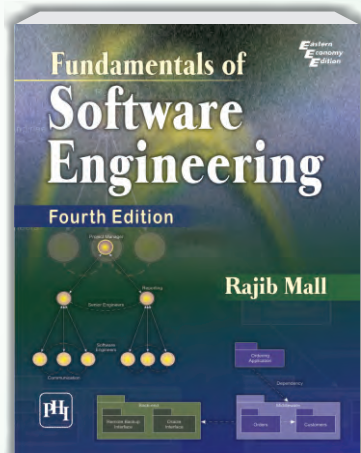
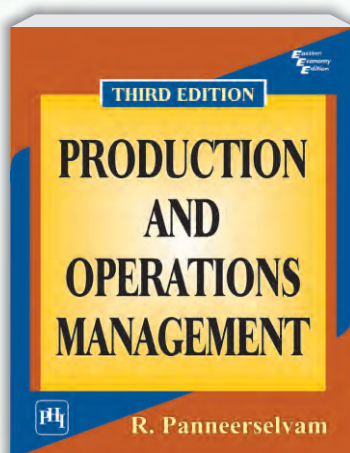
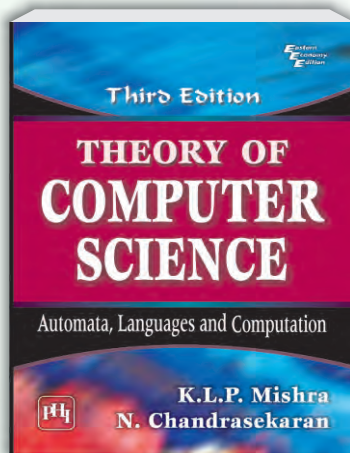
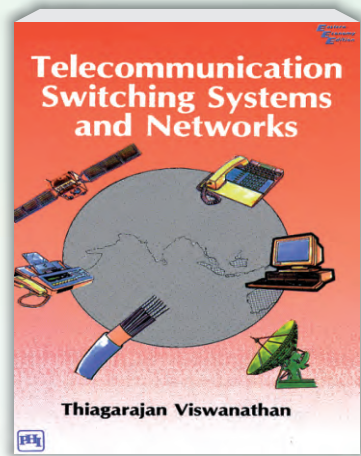
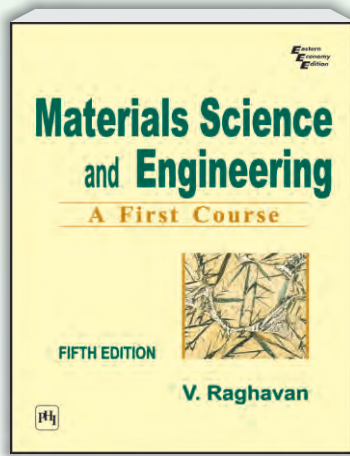
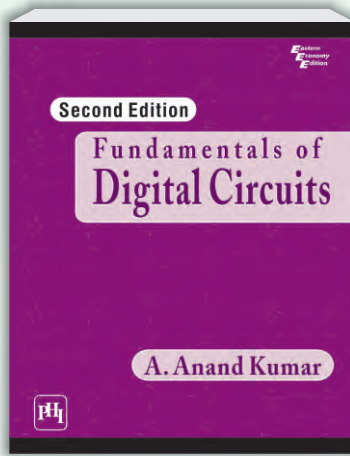
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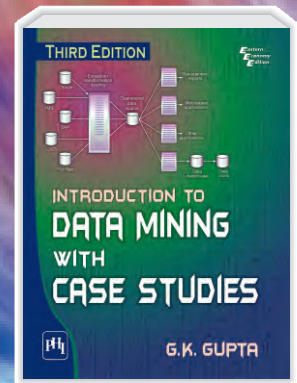
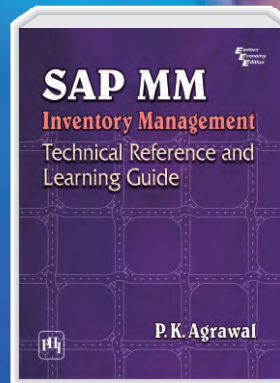
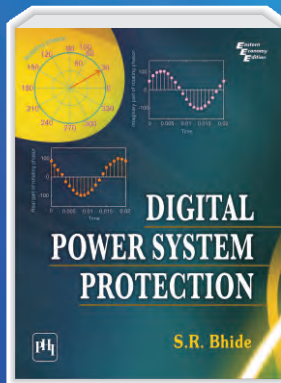
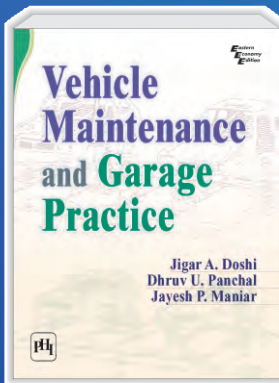
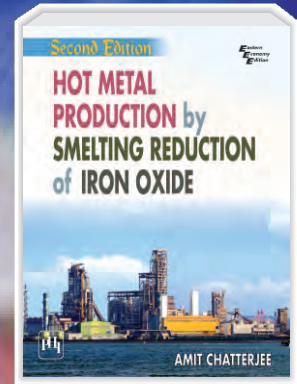
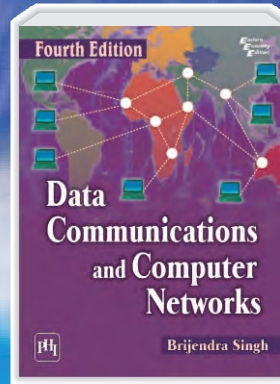
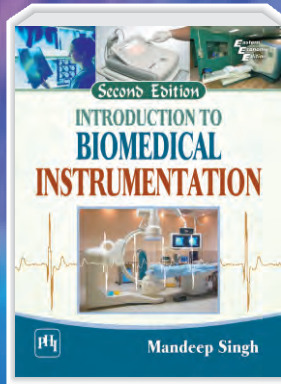
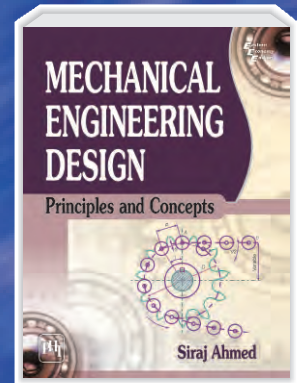
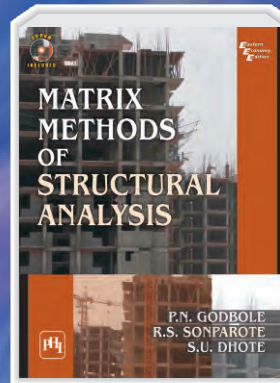
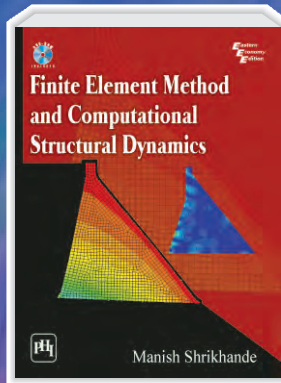
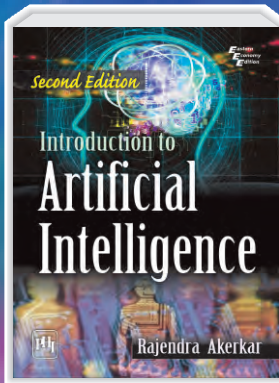
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