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ENGINEERING
Agricultural, Chemical,
Civil and Environmental

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Engineering

Agricultural Engineering

DAS

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 2008 / 552 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3586-8 / Rs. 395.00

DAS & SAIKIA

Irrigation and Water Power Engineering

MADAN MOHAN DAS, *has been Professor, Civil Engineering Department, Assam Engineering College, Guwahati. An emeritus Fellow of AICTE and Director of Technical Education, Government of Assam.*

MIMI DAS SAIKIA, *has been with the Department of Civil Engineering, National Institute of Technology, Silchar.*

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.

KEY FEATURES

- Provides worked out examples and problems (in SI units).
- Presents all possible methods of design including Ranga-Raju-Misri's new approach of canal design.
- Gives numerous illustrations to reinforce the understanding of the subject.

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 2009 / 436 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-3587-5 / Rs. 350.00

MAJUMDAR

Irrigation Water Management: Principles and Practice

DILIP KUMAR MAJUMDAR, *Professor of Agronomy, Institute of Agriculture, Visva-Bharati University.*

This book fills 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 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 has an extensive glossary, whilst a detailed bibliography concludes each chapter.

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. Appendices. Glossary. Index.

Latest Print 2009 / 500 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-1729-1 / Rs. 325.00

PRASADA RAO

Agricultural Meteorology

G.S.L.H.V. PRASADA RAO, *Professor and Head, Department of Agricultural Meteorology, College of Horticulture, Kerala Agricultural University (KAU), Vellanikkara, Thrissur, Kerala.*

Designed as a textbook for undergraduate and postgraduate students of agriculture, it fulfills the need for an up-to-date comprehensive information (as per the syllabus framed by ICAR) on the theoretical and applied aspects of *agricultural meteorology*.

Illustrated with graphs, schematic representations, photographs and pictures, the scope of the book is divided into three major areas of study:

1. Discusses the basic aspects of agricultural meteorology; introduces the principal meteorological variables (with emphasis on radiation and temperature) that govern the atmosphere and highlights the causal factors leading to the global and local weather and climate variations like atmospheric pressure and winds, clouds, monsoon and precipitation.
2. Addresses the effects of weather on various crops and discusses applications of Hopkin's bioclimatic law to mitigate the ill effects of weather on crop production; explains agroclimatic classification and discusses droughts and their management strategy with special reference to crops.
3. Deals with various types of weather forecasting and their techniques including weather service to farmers; explains crop growth simulation modelling—a newly emerging area in agricultural meteorology; focuses on influence of weather in relation to pest and disease outbreaks, discusses climate change and provides introduction to remote sensing.

A special feature of the book is that it contains many indigenous examples related to the humid tropics. In addition, the book has many plates and information on basic and sophisticated meteorological equipment.

A variety of chapter-end questions help develop students' understanding of salient concepts and makes the material presented more meaningful.

CONTENTS: Preface. Introduction. Radiation. Temperature. General Circulation. Atmospheric Moisture. Clouds. Precipitation. Monsoon. Weather and Crops. Evapotranspiration. Drought. Agroclimatic Classification. Weather Forecasting. Crop Simulation Modelling. Influence of Weather on Pest and Disease Outbreaks. Climate Change. Remote Sensing. Subject

Index. Geographical Index—India. Geographical Index—Other Countries.

Latest Print 2008 / 384 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-3338-3 / Rs. 325.00

Chemical/Biochemical Engineering

AHUJA

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.

KEY FEATURES

- Includes a large number of fully worked-out examples to help students master the concepts discussed.
- Provides well-graded problems with answers at the end of each chapter to test and foster students' conceptual understanding of the subject. The total number of solved examples and end-chapter exercises in the book are over 600.

- Contains chapter summaries that review the major concepts covered.

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 2008 / 720 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3637-7 / Rs. 450.00

ANANTHARAMAN & SHERIFFA BEGUM Elements of Mass Transfer, Part I

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

K.M. MEERA SHERIFFA BEGUM, *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. It is imperative therefore that a chemical/process engineer should have sound knowledge on the basics of mass transfer and its applications. This book is designed to equip the reader with sufficient knowledge on mass transfer operations and face the challenges ahead.

The objective of this comprehensive and upto-date 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, Theories of mass transfer, Equipments for mass transfer operations, Humidification, Drying and Crystallization. The

text lays emphasis on illustrating the application of theory through worked-out numerical examples. In addition, it provides numerous problems for the students to practice the concepts discussed.

KEY FEATURES

- Explains the theoretical concepts with full derivation of equations.
- Includes the constructional features, operations and the applications of the equipments commonly used in mass transfer operations.
- Describes the fundamentals of mass transfer to foster an understanding of the concepts in mass transfer.

This well-written text is primarily intended for the undergraduate students of chemical, pharmaceutical and petrochemical engineering. It will also be useful to plant engineers and design professionals.

CONTENTS: Foreword. Preface. Acknowledgements. Introduction to Mass Transfer. Diffusion. Mass Transfer Coefficient and Interphase Mass Transfer. Equipments for Gas-Liquid Operations. Humidification. Drying. Crystallisation. Appendix. Index.

Latest Print 2005 / 208 pp. / 16.0 × 24.1 cm
ISBN-81-203-2728-4 / Rs. 175.00

BEQUETTE

Process Control: Modeling, Design, and Simulation

B. WAYNE BEQUETTE, *Rensselaer Polytechnic Institute.*

The goal of this text, designed for chemical engineering students, is to provide an introduction to the modeling, analysis, and simulation of the dynamic behaviour of chemical processes. Rather than simply present theory and develop analytic solutions, this textbook uses *interactive learning* through computer-based simulation exercises (modules). It teaches students the field's most important techniques, behaviors and control problems through practical examples, supplemented by 16 hands-on learning modules that demonstrate computer simulations based on the popular MATLAB software package, including the SIMULINK block-diagram simulation environment.

CONTENTS: Preface. Introduction. Fundamental Models. Dynamic Behavior. Empirical Models. Introduction to Feedback Control. PID Controller Tuning. Frequency-Response Analysis. Internal Model Control. The IMC-Based PID Procedure. Cascade and Feed-Forward Control. PID Enhancements. Ratio, Selective, and Split-Range Control. Control-Loop Interaction. Multivariable Control. Plantwide Control.

Model Predictive Control. Summary. MODULES—Introduction to MATLAB. Introduction to SIMULINK. Ordinary Differential Equations. MATLAB LTI Models. Isothermal Chemical Reactor. First-Order + Time-Delay Processes. Biochemical Reactors. CSTR. Steam Drum Level. Surge Vessel Level Control. Batch Reactor. Biomedical Systems. Distillation Control. Case Study Problems. Flow Control. Digital Control. Index. About the Author.

Latest Print 2008 / 800 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2265-3 / Rs. 395.00

DOBLE & GUMMADI

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 / Rs. 195.00

DUTTA

Heat Transfer: Principles and Applications

BINAY K. DUTTA, *Professor, 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.

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 2009 / 544 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-1625-6 / Rs. 275.00**

DUTTA

Principles of Mass Transfer and Separation Processes

BINAY K. DUTTA, *Professor, 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 2009 / 960 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2990-4 / Rs. 495.00**

FOGLER

Elements of Chemical Reaction Engineering, 4th ed. (with Two CD-ROMs)

H. SCOTT FOGLER, *Ame and Catherine Vennema Professor of Chemical Engineering, The University of Michigan, Ann Arbor.*

This worldwide best-selling text, now in its fourth edition, is suitable for both undergraduate and postgraduate courses in chemical engineering and its

allied disciplines such as biochemical engineering and biotechnology. It provides thorough coverage of the fundamentals of chemical reaction engineering in a framework that allows students to develop practical problem-solving skills. Woven around the six pillars of chemical reaction engineering such as mole balances, rate laws, stoichiometry, energy balances, diffusion and contracting, the book builds a strong understanding of the underlying principles and illustrates how they can be applied to numerous reactions in a variety of applications. With a combination of user-friendly software and algorithms, it helps students learn how to solve problems through *reasoning*, rather than by memorizing equations. Significant effort has been devoted to developing examples and problems that foster students' critical and creative thinking. Three styles of problems—*straightforward*, *explorative*, and *open-ended*—have been included to enhance the transfer of skills to real-life settings.

H. Scott Fogler has updated his classic text to provide even more coverage of bioreactions, industrial chemistry with real reactors and reactions, and a broader range of applications, along with the newest digital techniques such as COMSOL Multiphysics. The book also contains wide-ranging examples—from smog to blood clotting, ethylene oxide production to tissue engineering, antifreeze to cobra bites, and computer chip manufacturing to chemical plant safety.

CD-ROM: The companion CD-ROM offers numerous learning resources such as summary notes, interactive computer modules, web modules, solved problems, problem-solving heuristics, POLYMATH software to explore "living example problems" and ask "what-if" questions, and many more enrichment opportunities for both students and teachers.

CONTENTS: Preface. Mole Balances. Conversion and Reactor Sizing. Rate Laws and Stoichiometry. Isothermal Reactor Design. Collection and Analysis of Rate Data. Multiple Reactions. Reaction Mechanisms, Pathways, Bioreactions, and Bioreactors. Steady-State Nonisothermal Reactor Design. Unsteady-State Nonisothermal Reactor Design. Catalysis and Catalytic Reactors. External Diffusion Effects on Heterogeneous Reactions. Diffusion and Reaction. Distributions of Residence Times for Chemical Reactors. Models for Nonideal Reactors. APPENDIXES—A: Numerical Techniques. B: Ideal Gas Constant and Conversion Factors. C: Thermodynamic Relationships Involving the Equilibrium Constant. D: Measurement of Slopes of Semilog Paper. E: Software Packages. F: Nomenclature. G: Rate Law Data. H: Open-Ended Problems. I: How to Use the CD-ROM. J: Use of

Computational Chemistry Software Packages. Index. About the CD-ROM.

**Latest Print 2009 / 1116 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3416-8 / Rs. 525.00**

FRIED

Polymer Science and Technology, 2nd ed.

JOEL R. FRIED, *Professor of Chemical Engineering and Past Director of the Polymer Research Center, and Head of the Department of Chemical and Materials Engineering at the University of Cincinnati.*

The book presents both the current state of polymer science and technology, and emerging advances in the field. The author offers thoroughly updated coverage of polymers processing principles and the latest polymer applications in a wide range of industries—including medicine, biotechnology, chemicals, and electronics.

In addition to synthetic polymer chemistry, the book covers polymer properties in solution and in melt, rubber, and solid states, and surveys all important categories of plastics. This edition also adds many new example calculations, homework problems, and bibliographic references. In-depth coverage includes:

- Polymer synthesis, including metallocene catalysis, atom-transfer radical and plasma polymerization, the use of superficial fluids, and genetic engineering
- Amorphous and crystalline states, transitions, and mechanical properties
- Characterization techniques, including new coverage of temperature-modulated DSC
- Polymer engineering, from rheology to modelling of polymer processing operations
- Fundamental principles of polymer blends and composites—including up-to-the-minute discussions of nanocomposites
- Commodity thermoplastics and fibres, with new coverage of syndiotactic polystyrene, biopolymers, and naturally occurring polymers
- Engineering and specialty polymers, including dendrimers and hyperbranched polymers, amorphous Teflon, and new electrical/optical applications
- Membrane separations and new coverage of barrier polymers

CONTENTS: Preface. Preface to First Edition. Acknowledgments. Introduction to Polymer Science. Polymer Synthesis. Conformation, Solutions, and Molecular Weight. Solid-State Properties. Viscoelasticity and Rubber Elasticity. Polymer Degradation and

the Environment. Additives, Blends, and Composites. Biopolymers, Natural Polymers, and Fibers. Thermoplastics, Elastomers, and Thermosets. Engineering and Specialty Polymers. Polymer Processing and Rheology. Polymers for Advanced Technologies. Appendices—A. Polymer Abbreviations. B. Representative Properties of Some Important Commercial Polymers. C. ASTM Standards for Plastics and Rubber. D. SI Units and Physical Constants. E. Mathematical Relationships. F. The Major Elements. Index.

Latest Print 2009 / 600 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2770-2 / Rs. 325.00

GEANKOPLIS

Transport Processes and Separation Process Principles (Includes Unit Operations), 4th ed.

CHRISTIE JOHN GEANKOPLIS, *University of Minnesota.*

The title of this thoroughly updated fourth edition has been changed from *Transport Processes and Unit Operations* to *Transport Processes and Separation Process Principles (Includes Unit Operations)* to reflect the modern nomenclature being used. This book designed for chemical engineering students and professionals provides a sound understanding of principles and practical applications of momentum, heat, and mass transfer processes, as well as separation processes.

The text is divided into two parts. Part 1 covers the essential principles underlying transport processes: momentum transfer; steady-state and unsteady-state heat transfer; and mass transfer, including both unsteady-state and convective mass transfer. Part 2 covers key separation processes, including evaporation, drying, humidification, absorption, distillation, adsorption, ion exchange, extraction, leaching, crystallization, dialysis, gas membrane separation, reverse osmosis, filtration, ultrafiltration, microfiltration, settling, centrifugal separation, and more. This edition's extensive updates and enhancements include:

A more thorough coverage of momentum, heat, and mass transport processes.

Detailed new coverage of separation process applications.

Greatly expanded coverage of momentum transfer, including fluidized beds and non-Newtonian fluids.

More detailed discussions of mass transfer, absorption, distillation, liquid-liquid extraction, and crystallization.

New coverage of membrane separation processes and gas-membrane theory.

The book features more than 240 example problems and over 550 end-of-chapter problems reflecting the field's current methods and applications.

CONTENTS: Preface. Part 1: Transport Processes: Momentum, Heat, and Mass—Introduction to Engineering Principles and Units. Principles of Momentum Transfer and Overall Balances. Principles of Momentum Transfer and Applications. Principles of Steady-State Heat Transfer. Principles of Unsteady-State Heat Transfer. Principles of Mass Transfer. Principles of Unsteady-State and Convective Mass Transfer. Part 2: Separation Process Principles (Includes Unit Operations)—Evaporation. Drying of Process Materials. Stage and Continuous Gas-Liquid Separation Processes. Vapor-Liquid Separation Processes. Liquid-Liquid and Fluid-Solid Separation Processes. Membrane Separation Processes. Mechanical-Physical Separation Processes. Appendices. Notation. Index.

Latest Print 2008 / 1040 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2614-9 / Rs. 450.00

GHOSH

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 / Rs. 425.00

GHOSH

Numerical Methods with Computer Programs in C++ (with CD-ROM)

PALLAB GHOSH, *Assistant Professor in the Department of Chemical Engineering, IIT Guwahati.*

Today, C++ is gaining prominence as a programming language and is emerging as a preferred choice of programmers because of its many attractive features and its user-friendly nature. And this text, intended for undergraduate students of engineering as well as for students of Mathematics, Physics and Chemistry, shows how numerical methods can be applied in solving engineering problems using C++. The text, while emphasizing the application aspects, also provides deep insight into the development of numerical algorithms.

KEY FEATURES

- Gives detailed step-by-step description of numerical algorithms and demonstrates their implementation. Each method is illustrated with solved examples.
- Provides C++ programs on many numerical algorithms. Elementary problems from various branches of science and engineering are solved.
- Contains 79 programs written in C++.
- Provides about 200 solved examples which illustrate the concepts.
- The Exercise problems, with various categories like Quiz, Analytical and Numerical Problems and Software Development Projects, drill the students in self-study.
- The accompanying **CD-ROM** contains all the programs given in the book.

Students as well as programmers should find this text immensely useful for its numerous student-friendly features coupled with the elegant exposition of concepts and the clear emphasis on applications.

CONTENTS: Preface. C++ and Object-Oriented Programming. Accuracy and Stability in Numerical Computing. Solution of Simultaneous Linear Algebraic Equations. Solution of Nonlinear Equations. Eigenvalues and Eigenvectors of Matrices. Statistical Analysis of Data. Curve Fitting. Sorting of Data. Approximation of Functions. Interpolation. Numerical Integration. Numerical Differentiation. Solution of Ordinary Differential Equations: Initial Value Problems. Solution of Ordinary Differential Equations: Boundary Value Problems. Numerical Solution of Partial Differential Equations. Appendix. Suggested Further Reading. Index.

Latest Print 2009 / 648 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2987-4 / Rs. 395.00

HALDER

Introduction to Chemical Engineering Thermodynamics

GOPINATH HALDER, *Assistant Professor and Head of Department of Chemical Engineering in Durgapur Institute of Advanced Technology and Management (DIATM), Durgapur, West Bengal.*

This book provides a comprehensive introduction to the principles of chemical engineering thermodynamics and also introduces the student to the application of principles to various practical areas. Though intended primarily for undergraduate students of Chemical Engineering, the book will also be useful for postgraduate students of the subject as well as professionals in the relevant fields.

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, the flow, refrigeration and liquefaction processes, and the equilibria between phases and in chemical reactions.

The book is suitably illustrated with a large number of visuals. It contains numerous solved examples in each chapter, as well as solved model question papers and a set of 360 multiple-choice questions at the end

of the book, to help students develop problem-solving skills. Plentiful exercises at the end of each chapter help develop the students' ability and confidence in the application of the underlying concepts.

CONTENTS: Preface. Acknowledgements. Dedication. 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. Appendices—A: Property Tables. B: Solved Model Question Papers. C: Multiple Choice Questions. Bibliography. Index.

660 pp. (approx.) / 17.8 x 23.5 cm
ISBN-978-81-203-3846-3 / Forthcoming

HIMMELBLAU & RIGGS
**Basic Principles and Calculations in
Chemical Engineering, 7th ed.**
(with CD-ROM)

DAVID M. HIMMELBLAU, *University of Texas*, and
JAMES B. RIGGS.

In addition to the traditional introductory chemical engineering topics, this book covers applications that reflect the expanded scope of chemical engineering including bioengineering, microelectronics processing, environmental engineering, and nanotechnology. As a result, this book provides a complete, practical, and student-friendly introduction to the principles and techniques of contemporary chemical, petroleum, and environmental engineering.

The seventh edition is revised to reflect the latest technologies and educational strategies that develop a student's abilities for reasoning and critical thinking.

Coverage includes:

- 29 short chapters provide a flexible modular sequence of topics for courses of varying length
- A thorough coverage of introductory material, including unit conversions, basis selection, and process measurements
- Consistent, sound strategies for solving material and energy balance problems
- Key concepts ranging from stoichiometry to enthalpy

- Behavior of gases, liquids, and solids: ideal/real gases, single component two-phase systems, gas-liquid systems, and more
- New examples and problems covering environmental, safety, semiconductor processing, green engineering, nanotechnology, and biotechnology
- Extensive tables and charts, plus glossaries in every chapter
- Self-assessment tests, thought/discussion problems, and homework problems for each chapter
- 13 appendices providing extensive reference material

CONTENTS: Preface. Read Me. Frequently Asked Question. Part 1: INTRODUCTION—Dimensions, Units, and Their Conversion. Moles, Density, and Concentration. Choosing A Basis. Temperature. Pressure. Part 2: MATERIAL BALANCES—Introduction to Material Balances. A General Strategy For Solving Material Balance Problems. Solving Material Balance Problems for Single Units Without Reaction. The Chemical Reaction Equation and Stoichiometry. Material Balances for Processes Involving Reaction. Material Balance Problems Involving Multiple Units. Recycle, Bypass, Purge, and The Industrial Application of Material Balances. Part 3: GASES, VAPORS, LIQUIDS, AND SOLIDS—Ideal Gases. Real Gases: Compressibility. Real Gases: Equations of State. Single Component Two-Phase Systems (Vapor Pressure). Two Phase Gas-Liquid Systems (Saturation, Condensation, and Vaporization). Two-Phase Gas-Liquid Systems (Partial Saturation and Humidity). The Phase Rule and Vapor-Liquid Equilibria. Liquids And Gases in Equilibrium with Solids. Part 4: ENERGY BALANCES—Energy: Terminology, Concepts, and Units. Introduction to Energy Balances for Processes Without Reaction. Calculation of Enthalpy Changes. Application of Energy Balances in The Absence of Chemical Reactions. Energy Balances: How to Account for Chemical Reaction. Energy Balances That Include The Effects of Chemical Reaction. Ideal Processes, Efficiency, and The Mechanical Energy Balance. Heats of Solution And Mixing. Humidity (Psychrometric) Charts and Their Use. Part 5: SUPPLEMENTARY MATERIAL (ON THE ACCOMPANYING CD)—Analysis of The Degrees of Freedom in A Steady-State Process. Solving Material and Energy Balances Using Process Simulators (Flowsheeting Codes). Unsteady-State Material and Energy Balances. Appendices—A: Answers to Self-Assessment Tests. B: Atomic Weights and Numbers. C: Table of The Pitzer Z^0 And Z^1 Factors. D: Physical Properties of Various Organic and Inorganic Substances. E: Heat Capacity Equations. F: Heats of Formation and Combustion. G: Vapor Pressures. H: Heats of Solution and Dilution. I:

Enthalpy-Concentration Data. J: Thermodynamic Charts. K: Physical Properties of Petroleum Fractions. L: Solution of Sets of Equations. M: Fitting Functions of Data. N: Answers to Selected Problems. Index.

Latest Print 2009 / 1160 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3839-5 / Rs. 450.00

INAMDAR

Biochemical Engineering: Principles and Concepts, 2nd ed.

SYED TANVEER AHMED INAMDAR, *Assistant Professor in the Department of Chemical Engineering, SDM College of Engineering and Technology, Dharwad, Karnataka.*

This book, now in its second 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 the chemical engineering discipline.

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 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 bioreactor design and operation. Finally, this book offers a clear description of various aspects of controlling microorganisms in addition to downstream processing. Besides, it 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

- Gives a separate section on kinetic of multi-substrate systems (Chapter 3).
- Describes modulation and regulation of enzyme activity (Chapter 3).
- Provides a new section on production of enzymes on a commercial scale (Chapter 4).
- Highlights diffusional mechanisms and limitations in the immobilized enzyme systems (Chapter 5).
- Offers a new section on reactors and mass balance (with and without recycle) and their configurations (Chapter 6).
- Presents extended treatment of downstream processes along with chromatographic and membrane separations and electrophoresis (Chapter 9).
- Includes more solved examples and chapter-end exercises.

CONTENTS: 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. Appendix A: Process Kinetics and Reactor Analysis. Appendix B: Bioenergetics. Appendix C: Concepts in Environmental Microbiology. Glossary. Bibliography. Index.

Latest Print 2008 / 428 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-3677-3 / Rs. 325.00

JANA

Chemical Process Modelling and Computer Simulation

AMIYA K. JANA, *Assistant Professor at IIT Kharagpur.*

This text presents the fundamental concepts of how mathematical models of chemical processes are constructed and demonstrates their application 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, distillation columns (both 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.

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. Continuous Stirred Tank 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. Index.

Latest Print 2008 / 288 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3196-9 / Rs. 275.00

JANA

Process Simulation and Control Using Aspen™

AMIYA K. JANA, *Assistant Professor at IIT Kharagpur.*

As the complexity of a plant integrated with several process units increases, solving the model structure with a large equation set becomes a challenging task. To overcome this situation, various process flowsheet simulators are used. This book describes the simulation, optimization, dynamics and closed-loop control of a wide variety of chemical processes using the most popular commercial flowsheet simulator Aspen™.

The book presents the Aspen simulation of a large variety of chemical units, including flash drum, continuous stirred tank reactor (CSTR), plug flow reactor (PFR), petroleum refining column, heat exchanger, absorption tower, reactive distillation, distillation train, and monomer production unit. It also discusses the dynamics and control of flow-driven as well as pressure-driven chemical processes using the Aspen Dynamics package.

KEY FEATURES

- Acquaints the students with the simulation of large chemical plants with several single process units.
- Includes a large number of worked-out examples illustrated in step-by-step format for easy understanding of the concepts.
- Provides chapter-end problems for extensive practice.

This book is suitable for the undergraduate and postgraduate students of chemical engineering. It will also be helpful to research scientists and practising engineers.

CONTENTS: Preface. Acknowledgement. Part I:

STEADY STATE SIMULATION AND OPTIMIZATION USING ASPEN PLUS™—Introduction and Stepwise Aspen Plus™ Simulation: Flash Drum Examples. Aspen Plus™ Simulation of Reactor Models. Aspen Plus™ Simulation of Distillation Models. Part II: CHEMICAL PLANT 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 2009 / 336 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3659-9 / Rs. 295.00

KARAK

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 Nanocomposites. Product Manufacturing. References. Index.

**Latest Print 2009 / 304 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3877-7 / Rs. 275.00**

KYLE

Chemical and Process Thermodynamics, 3rd ed. (with CD-ROM)

B.G. KYLE, *Emeritus Professor of Chemical Engineering, Kansas State University.*

This is an example-rich guide to chemical engineering thermodynamics that focuses on current techniques, new applications, and today's revolutionary computer tools. The sequentially organized book helps in discovering both the "how" and "why" of chemical engineering thermodynamics, and helps to improve the problem-solving effectiveness with an extensive collection of sophisticated PC software.

This brand new third edition reflects newly-developed techniques and applications and includes a thorough treatment of complex chemical equilibria as well as philosophy and practice of modeling thermodynamic systems.

CD-ROM: The accompanying CD-ROM contains nine executable programs, three spreadsheets for professional calculations, POLYMATH numerical analysis software, and EQUATIONS OF STATE software for thermodynamic process visualization on 3D PVT diagrams.

CONTENTS: Preface. Notation. Introduction The First Law of Thermodynamics. The Behavior of Fluids. The Second Law of Thermodynamics. The Thermodynamic Network. Heat Effects. Equilibrium and Stability. Thermodynamics of Pure Substances. Principles of Phase Equilibrium. Applied Phase Equilibrium. Additional Topics in Phase Equilibrium. Chemical Equilibrium. Complex Chemical Equilibrium. Thermodynamic Analysis of Processes. Physicochemical Processes.

Compressible Fluid Flow. Thermodynamics and Models. Appendixes. Index.

**Latest Print 2008 / 788 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2512-8 / Rs. 375.00**

NARAYANAN

A Textbook of Chemical Engineering Thermodynamics

K.V. NARAYANAN, *Professor and Head, Department of Chemical Engineering, Government Engineering College, Thrissur.*

This book on thermodynamics deals exclusively with the theory and applications relevant to chemical processes. It is intended as a textbook for undergraduate courses in chemical engineering.

More than 200 worked-out examples and 400 end-of-chapter problems are provided to help the student gain a better insight into the theory. The SI units are used throughout. A number of objective-type questions are included in an Appendix which will be of immense help to students in preparing for the competitive examinations.

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.

CONTENTS: Preface. Introduction and Basic Concepts. First Law of Thermodynamics. P-V-T Behaviour and Heat Effects. Second Law of Thermodynamics. Some Applications of the Laws Thermodynamics. Thermodynamic Properties of Pure Fluids. Properties of Solutions. Phase Equilibria. Chemical Reaction Equilibria. Appendixes. Answers to Problems. Index.

**Latest Print 2009 / 520 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-1732-1 / Rs. 325.00**

NARAYANAN & LAKSHMIKUTTY Stoichiometry and Process Calculations

K.V. NARAYANAN, *Professor and Head, Department of Chemical Engineering, Government Engineering College, Thrissur.*

B. LAKSHMIKUTTY, *Assistant 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 2006 / 604 pp. / 17.8 × 23.5 cm
ISBN-81-203-2992-9 / Rs. 350.00

NATH

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 2008 / 336 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-3532-5 / Rs. 295.00

PUSHPAVANAM

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 2009 / 336 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-1262-3 / Rs. 275.00

RAO

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 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.

KEY FEATURES

- Provides numerous worked-out examples
- Explains the concepts without excessive mathematical expressions and derivations
- Covers all engineering principles that are needed for a successful operation of a food processing plant
- Includes an extensive set of review questions at the end of each chapter

The present textbook is designed for students of BTech (Food Technology/Food Engineering) and MSc (Food Technology). Besides, the students of Biochemical Engineering, Chemical Engineering and Biotechnology will find it immensely useful.

CONTENTS: Preface. Foreword. 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.

688 pp. (approx.) / 17.8 × 23.5 cm
ISBN-978-81-203-3871-5 / Forthcoming

SHARMA

Principles of Mass Transfer

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

This book addresses the specific needs of undergraduate chemical engineering students for the two courses in Mass Transfer I and Mass Transfer II. It is also suitable for a course in Downstream Processing for biotechnology students.

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

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

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

KEY FEATURES

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

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

Applications in Mass Transfer. Appendix A. Appendix B. Index.

Latest Print 2007 / 452 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3142-6 / Rs. 295.00

SHULER & KARGI

Bioprocess Engineering: Basic Concepts, 2nd ed.

MICHAEL L. SHULER, *Cornell University.*

FIKRET KARGI, *Dokuz Eylul University.*

This comprehensive, fully updated text introduces the essential concepts of biochemical and bioprocess engineering to students in chemical engineering and those pursuing courses in related disciplines. The authors first review the relevant fundamentals of biochemistry, microbiology, and molecular biology, introducing key principles that enable bioprocess engineers to achieve consistent control over biological activity. The text then reflects the advances that are transforming the field, ranging from genetic sequencing to new techniques for producing proteins from recombinant DNA. It introduces techniques with broad applications to the production of pharmaceuticals, biologics, and commodities. It also covers medical applications such as tissue engineering and gene therapy and those used for solving critical environmental problems.

CONTENTS: Part 1: INTRODUCTION—What is a Bioprocess Engineer? Part 2: THE BASICS OF BIOLOGY: AN ENGINEER'S PERSPECTIVE—An Overview of Biological Basics. Enzymes. How Cells Work. Major Metabolic Pathways. How Cells Grow. Stoichiometry of Microbial Growth and Product Formation. How Cellular Information is Altered. Part 3: ENGINEERING PRINCIPLES FOR BIOPROCESSES—Operating Considerations for Bioreactors for Suspension and Immobilized Cultures. Selection, Scale-Up, Operation, and Control of Bioreactors. Recovery and Purification of Products. Part 4: APPLICATIONS TO NON-CONVENTIONAL BIOLOGICAL SYSTEMS—Bioprocess Considerations in using Animal Cell Cultures. Bioprocess Considerations in using Plant Cell Cultures. Utilizing Genetically Engineered Organisms. Medical Applications of Bioprocess Engineering. Mixed Cultures. Epilogue. Appendix: Traditional Industrial Bioprocesses.

Latest Print 2008 / 576 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2110-6 / Rs. 325.00

SINGH

Process Control: Concepts, Dynamics and Applications

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

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

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

KEY FEATURES

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

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

CONTENTS: Foreword. Preface. Acknowledgements. Part I: PROCESS CONTROL CONCEPTS—Introduction to Process Control Systems. Process Control Modelling. Feedback Control System. Part II: PROCESS CONTROL DYNAMICS AND DESIGN—Response Analysis of Control System and Stability Criterion. Design of Process Control Systems. Part III: ADVANCED PROCESS CONTROL—Advanced Process Control Strategies. Part IV: COMPUTER-BASED CONTROL—Computer-Aided Process Control. Computer Hardware for Process Control. Computer Software for Process Control. Microcomputer-Based Process Control—A Programmable Logic Controller (PLC). Microcomputer-Based Process Control—A Distributed Control System (DCS).

Part V: CASE STUDIES—Process Control: Case Study. Bibliography. Answers to Self-Check Quizzes. Index.

**Latest Print 2008 / 748 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3678-0 / Rs. 450.00**

SINHA

Outlines of Polymer Technology: Manufacture of Polymers

R. SINHA, *Professor of Chemical Engineering at Andhra University, Visakhapatnam.*

This book presents a new approach to bring out the fundamentals of polymer science and the associated manufacturing processes, clearly and precisely, in question-answer format. It fully addresses the needs of undergraduate and diploma level chemical engineering students for a self-contained textbook on polymer technology. The questions are framed according to the pattern followed in examinations of universities and state boards of technical education. The text fully conforms to the requirements of an introductory course included in syllabi of several universities and polytechnics.

In this unique attempt, the author provides the reader with the necessary foundations of polymer science as well as comprehensive coverage of the methods of manufacture of polymers adopted in commercial practice.

CONTENTS: Preface. PART I: FUNDAMENTALS (Questions 1–27 with Answers). PART II: MANUFACTURING PROCESSES—Section I: Thermoplastics (Questions 28–82 with Answers). Section II: Thermosets (Questions 83–131 with Answers). Index.

**Latest Print 2002 / 232 pp. / 17.8 × 23.5 cm
ISBN-81-203-1728-9 / Rs. 175.00**

SINHA

Outlines of Polymer Technology: Processing Polymers

R. SINHA, *Professor of Chemical Engineering at Andhra University, Visakhapatnam.*

This book is a sequel to the author's earlier book, *Outlines of Polymer Technology: Manufacturing of Polymers* (PHI, 2000), designed in the similar question-answer format to cover the processing techniques of polymers. Together, the two books would make a complete study of the subject of Polymer Technology.

The text introduces the students to the basic concepts regarding the process technologies by which polymers are transformed into consumer goods. The entire content has been planned to cover the syllabus of a two-semester course in Polymer/Plastics technology. Moreover, the questions are framed according to the pattern followed in examinations of universities and state boards of technical education, making it an ideal textbook for undergraduate as well as diploma-level courses in chemical engineering.

CONTENTS: Preface. Acknowledgement. Introduction. Mixing and Compounding. Extrusion. Compression Moulding. Transfer Moulding. Injection Moulding. Blow Moulding. Calendering. Coating. Casting. Spinning. Thermoforming. Lamination. Encapsulation and Potting. Welding and Joining. Finishing Operations. References. Index.

Latest Print 2002 / 220 pp. / 17.8 × 23.5 cm
ISBN-81-203-2188-X / Rs. 175.00

SIVASANKAR

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 bioseparations, 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 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 2008 / 280 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-2649-1 / Rs. 250.00

SIVASANKAR

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 2009 / 372 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-2086-4 / Rs. 250.00

STEPHANOPOULOS

Chemical Process Control: An Introduction to Theory and Practice

G. STEPHANOPOULOS, *Massachusetts Institute of Technology.*

Covering all aspects of chemical process control, this thorough overview explores process modelling, dynamic analysis of processing systems, a large variety of control schemes, synthesis of multivariable control configurations for single units and complete chemical plants, and analysis and design of digital computer control systems. Emphasis is on problem formulation, analysis of posed control problems, and the synthesis and evaluation of alternative control systems.

The book discusses both controller design concepts and hardware elements needed for practical implementation of various control schemes. It also provides a concise outline of the control systems found in chemical processes and describes the design of control systems for multivariable processes and complete chemical plants.

A large number of examples, end-of-chapter questions, and problems are included.

CONTENTS: The Control of a Chemical Process: Its Characteristics and Associated Problems. Modelling the Dynamic and Static Behavior of Chemical Processes. Analysis of the Dynamic Behavior of Chemical Processes. Analysis and Design of Feedback Control Systems. Analysis and Design of Advanced Control Systems. Design of Control Systems for Multivariable Processes. Introduction to Plant Control. Process Control Using Digital Computers.

Latest Print 2009 / 718 pp. / 15.3 × 22.9 cm
ISBN-978-81-203-0665-3 / Rs. 295.00

VENKATARAMANI & ANANTHARAMAN Process Calculations

V. VENKATARAMANI, *Retd. Professor at Department of Chemical Engineering, NIT, Trichy.*

N. ANANTHARAMAN, *Assistant Professor at Department of Chemical Engineering, R.E.C. Tiruchirapalli.*

To adopt the energy conservation techniques for the design of equipment in a process plant, an accurate evaluation of material and energy balances in every unit has to be made. This compact and student-friendly text introduces the basic chemical engineering principles and calculations, and exposes the reader to background information on units and measurement of physical properties.

Designed for a basic course at the undergraduate level the book will fulfil the needs of students offering courses in chemical engineering, environmental engineering and biotechnology.

CONTENTS: Preface. Units and Dimensions. Mass Relations. Ideal Gases. Vapour Pressure. Psychometry. Crystallization. Mass Balance. Recycle and Bypass. Energy Balance. Problems on Unsteady State Operations. Tables. Index.

Latest Print 2003 / 204 pp. / 16.0 × 24.1 cm
ISBN-81-203-2319-X / Rs. 150.00

Civil/Environmental Engineering

AGARWAL & SHRIKHANDE

Earthquake Resistant Design of Structures

PANKAJ AGARWAL, *Assistant Professor at the Department of Earthquake Engineering, Indian Institute of Technology Roorkee. He is a member of Indian Society of Earthquake Technology (ISET).*

MANISH SHRIKHANDE, *Assistant Professor at the Department of Earthquake Engineering, Indian Institute of Technology Roorkee. He is a recipient of Young Engineer Award of Indian National Academy of Engineering (INAE) and Career Award of AICTE.*

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 2009 / 660 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2892-1 / Rs. 425.00

BANDYOPADHYAY

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 2008 / 612 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3277-5 / Rs. 395.00

BATHE

Finite Element Procedures

KLAUS-JÜRGEN BATHE, *Professor of Mechanical Engineering, Massachusetts Institute of Technology.*

This practical textbook is the revised edition of the author's classic and includes the state-of-the-art methods in finite element procedures. The revision is thorough and comprehensive which makes the book more broad based.

The text explores the full range of finite element methods, but concentrates on certain finite element procedures such as techniques that are essential and often used in engineering practice. Written by a highly respected author on the subject, the text presents, in sufficient details, both the elementary concepts and advanced techniques while presenting statics, dynamics, solids, fluids, linear and nonlinear analysis.

Adequate attention is given to both the physical and mathematical characteristics of the procedures. Throughout the text, a representative selection of *worked-out examples* and complete programmes listings are provided, besides exercises for each chapter.

CONTENTS: Preface. An Introduction to the Use of Finite Element Procedures. Vectors, Matrices, and Tensors. Some Basic Concepts of Engineering Analysis and an Introduction to the Finite Element Method. Formulation of the Finite Element Method—Linear Analysis in Solid and Structural Mechanics. Formulation and Calculation of Isoparametric Finite Element Matrices. Finite Element Nonlinear Analysis in Solid and Structural Mechanics. Finite Element Analysis of Heat Transfer, Field Problems, and Incompressible Fluid Flows. Solution of Equilibrium Equations in Static Analysis. Solution of Equilibrium Equations in Dynamic Analysis. Preliminaries to the Solution of Eigenproblems. Solution Methods for

Eigenproblems. Implementation of the Finite Element Method. References. Index.

Latest Print 2009 / 1064 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-1075-9 / Rs. 550.00

CHAKROBORTY & DAS

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 2009 / 572 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2084-0 / Rs. 325.00

CHANDRUPATLA & BELEGUNDU
**Introduction to Finite Elements
 in Engineering, 3rd ed.**
 (with CD-ROM)

TIRUPATHI R. CHANDRUPATLA, *Rowan University, Glassboro, New Jersey.*

ASHOK D. BELEGUNDU, *The Pennsylvania State University, University Park, Pennsylvania.*

This updated and improved text, now in its third edition, presents an accessible introduction to finite methodologies through careful integration of theory with examples and exercises involving engineering applications. Addressing the needs of students, the book enumerates the requisite steps towards clear understanding of the theoretical concepts. The steps used in the development of theory are implemented in complete, self-contained computer programs. The programs have a common structure to enable the users to follow their development easily.

Beginning with a brief historical background and development of the fundamental concepts, the text emphasizes problem formulation and modelling in each chapter to help students develop a firm understanding of these critical skills.

New material has been added to cover acoustics, axisymmetric quadrilateral elements, conjugate gradient approach, and eigenvalue evaluation.

Comprehensive and flexible, the book satisfies the textbook requirements of senior undergraduate and postgraduate students of engineering as well as those of technical professionals for a valuable learning resource.

CONTENTS: Preface. Fundamental Concepts. Matrix Algebra and Gaussian Elimination. One-Dimensional Problems. Trusses. Two-Dimensional Problems Using Constant Strain Triangles. Axisymmetric Solids Subjected to Axisymmetric Loading. Two-Dimensional Isoparametric Elements and Numerical Integration. Beams and Frames. Three-Dimensional Problems in Stress Analysis. Scalar Field Problems. Dynamic Considerations. Preprocessing and Postprocessing. Appendix: *Proof of* $dA = \det \mathbf{J} d\xi d\eta$. Bibliography. Answers to Selected Problems. Index.

**Latest Print 2009 / 484 pages / 17.8 × 23.5 cm
 ISBN-978-81-203-2106-9 / Rs. 295.00**

CHENNAKESAVA R. ALAVALA
**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 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 2008 / 408 pp. / 17.8 × 23.5 cm
 ISBN-978-81-203-3584-4 / Rs. 325.00**

CLARKE, PARKS & CRANE (Eds.)
**Geographic Information Systems and
 Environmental Modeling**

KEITH C. CLARKE, *University of California, Santa Barbara.*

BRADLEY O. PARKS, *Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder.*

MICHAEL P. CRANE, *United States Geological Survey, EROS Data Center, Sioux Falls.*

This concise, contemporary book, which has contributions from several authors who have the experience and expertise in subjects dealt within the text, successfully integrates geographical information systems (GIS) and environmental models (EM). It is designed as a text for advanced courses in GIS/EM and for short-term courses in these subjects.

The book begins with a disciplinary perspective of GIS/EM, explores modeling frameworks, paradigms and approaches, and highlights the impact of the computer models, termed *geocomputation*. It then delineates in detail the consequences of integrating GIS and environmental models for decision making, time dimension in modeling, and gives methodological and practical examples of the importance of process modeling for physical systems.

CONTENTS: Preface. Modeling the Environment with GIS: A Historical Perspective from Geography. Modeling Frameworks, Paradigms and Approaches. Spatial Decision Support Systems and Environmental Modeling: An Application Approach. GIS Data Sources and Measurement Technologies for Modeling. Development, Calibration and Validation of Physical Models. Dynamic Systems Modeling and Four Dimensional Geographic Information Systems. Modeling Human-Environmental Systems. Modeling Physical Systems. Integrative Environmental Modeling. Case Studies in GIS. Visualizing Environmental Data. GIS/EM: Where Next? Index.

**Latest Print 2009 / 320 pp. / 17.8 × 23.5 cm
 ISBN-978-81-203-2174-8 / Rs. 275.00**

CODUTO

**Geotechnical Engineering: Principles
 and Practices**

DONALD P. CODUTO, *Professor of Civil Engineering California State Polytechnic University Pomona.*

This book offers a thorough, yet student-friendly, introduction to the field of geotechnical engineering.

It provides a comprehensive treatment of both the principles of soil mechanics and their applications to practical engineering problems, with an emphasis on understanding the physical basis for soil behaviour. Primarily designed for undergraduate civil engineering students, this integrated approach gives students a broader perspective of the subject matter and provides a solid foundation for future studies.

The material is reinforced with many example problems, homework problems, end-of-chapter problems, and easy-to-use Windows software developed specifically for this book. This software has been carefully integrated into the text, and is designed as a tool to enhance learning through exploration of more difficult problems that would otherwise be too tedious to solve by hand.

CONTENTS: Preface. Notation and Units of Measurement. Introduction to Geotechnical Engineering. Engineering Geology. Site Exploration and Characterization. Soil Composition. Soil Classification. Excavation, Grading, and Compacted Fill. Groundwater—Fundamentals. Ground-water—Applications. Geoenvironmental Engineering. Stress. Compressibility and Settlement. Rate of Consolidation. Strength. Stability of Earth Slopes. Dams and Levees. Lateral Earth Pressures and Retaining Walls. Structural Foundations. Difficult Soils. Soil Improvement. Geotechnical Earthquake Engineering. Appendices: A—Recommended Resources for Further Study. B—Unit Conversion Factors. C—Computer Software. References. Name Index. Subject Index.

**Latest Print 2008 / 780 pp. / 17.8 × 23.5 cm
 ISBN-978-81-203-2137-3 / Rs. 350.00**

DAMODARASAMY & KAVITHA
**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 2009 / 344 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3843-2 / Rs. 295.00**

DAS

Fluid Mechanics and Turbomachines

MADAN MOHAN DAS, *has been Professor, Civil Engineering Department, Assam Engineering College, Guwahati. An emeritus Fellow of AICTE and 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 2009 / 556 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3523-3 / Rs. 450.00**

DAS

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 2008 / 552 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3586-8 / Rs. 395.00

DAS

Open Channel Flow

MADAN MOHAN DAS, *has been Professor, Civil Engineering Department, Assam Engineering College, Guwahati. An emeritus Fellow of AICTE and 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 2009 / 360 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3522-6 / Rs. 325.00

DAS & SAIKIA

Hydrology

MADAN MOHAN DAS, *has been Professor, Civil Engineering Department, Assam Engineering College, Guwahati. An emeritus Fellow of AICTE and Director of Technical Education, Government of Assam.*

MIMI DAS SAIKIA, *has been with the department of civil engineering, National Institute of Technology, Silchar.*

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, water shed 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 2009 / 372 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3707-7 / Rs. 325.00

DAS & SAIKIA

Irrigation and Water Power Engineering

MADAN MOHAN DAS, *has been Professor, Civil Engineering Department, Assam Engineering College, Guwahati. An emeritus Fellow of AICTE and Director of Technical Education, Government of Assam.*

MIMI DAS SAIKIA, *has been with the Department of Civil Engineering, National Institute of Technology, Silchar.*

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.

KEY FEATURES

- Provides worked out examples and problems (in SI units).

- Presents all possible methods of design including Ranga-Raju-Misri's new approach of canal design.
- Gives numerous illustrations to reinforce the understanding of the subject.

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 2009 / 436 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-3587-5 / Rs. 350.00

DEB

Finite Element Method: Concepts and Applications in Geomechanics

DEBASIS DEB, *Assistant Professor, Department of Mining Engineering, Indian Institute of Technology Kharagpur.*

For the last three decades, numerical methods have found a wide range of applications in geomechanics. Of all the numerical methods, the finite element method (FEM) has the maximum applications in geomechanics. This book offers an insight into applications of FEM in designing, analyzing and optimizing structures or excavations made in the rock mass. A fine blend of finite element methodology and principles of rock mechanics, the text emphasizes the basics of stress-strain analysis, isoparametric finite element method, rock mass yielding/failure behaviour and its formulation in FEM procedure, and joint behaviour (as equivalent material and discrete system).

KEY FEATURES

- In-depth analysis of strength and deformability of jointed rock mass is provided.
- Many worked-out examples, including the tunnel examples, are interspersed throughout the text to help the readers grasp the concepts easily.
- The use of finite element method in elastic and elastic-plastic rock joints is discussed.

Besides senior undergraduate and postgraduate students in civil (including geotechnical) and mining engineering, the book will also benefit the practising engineers and researchers who wish to acquaint themselves with state-of-the-art techniques of FEM.

CONTENTS: Preface. Analysis of Stresses and Strains. Stress-Strain Relationships. Finite Element Method in Elasticity: Isoparametric Triangular Elements. Quadrilateral Finite Elements. Axisymmetric and 3D Finite Element Method. Rock and Rock Mass Failure Criteria. Elastic-Plastic Finite Element Analysis. Strength and Deformability of Jointed Rock Mass. Finite Element Procedures of Rock Joints. APPENDIX A. Galerkin Finite Element Method. APPENDIX B. Skyline Storage of Stiffness Matrix. References. Answers to Exercises. Index.

Latest Print 2009 / 284 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2983-6 / Rs. 250.00

FAY

Introduction to Fluid Mechanics

JAMES A. FAY, *Professor Emeritus of Mechanical Engineering, Massachusetts Institute of Technology.*

The text is a well-written introduction for a basal course in mechanical engineering. Rigorous in its approach, the book is distinguishable by the choice and order of the subject matter, its careful derivation and explanation of the laws of fluid mechanics, and its attention to everyday examples of fluid flow and common engineering applications.

The text introduces the principles of fluid mechanics in a well organised and methodical manner, beginning with the simple and proceeding to the complex. At each stage, practical engineering problems are solved, principally in engineering systems such as dams, pumps, turbines, pipe flows, but with occasional illustrations from physiological and meteorological flows. The approach builds on the students' everyday experience with fluid mechanics, showing how scientific principles permit a quantitative understanding of what is happening and provide a basis for designing engineering systems that achieve the desired objectives.

KEY FEATURES

- To save time, the derivations of the fluid principles are concisely given through the use of theorems of vector calculus.
- More attention is given to unsteady flows and their importance in pipe flow and external flows.
- The examples and exercises illustrate real

engineering situations, including physically realistic values of the problem variables. Many of these problems require calculation of numerical values, giving the student experience in judging the correctness of the students' numerical skills.

CONTENTS: Introduction. Fluid Statics. Conservation of Mass. Inviscid Flow. Conservation of Momentum. Laminar Viscous Flow. Turbulent Viscous Flow. Conservation of Energy. Flow in Fluid Systems. Dimensional Analysis and Modeling. Irrotational Flow. Compressible Flow. Index.

Latest Print 2008 / 628 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-1044-5 / Rs. 350.00

GAMBHIR

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 2008 / 740 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3193-8 / Rs. 425.00

GAMBHIR Fundamentals of Reinforced Concrete Design

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 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.

MAJOR TOPICS DISCUSSED ARE

- **Practical Design of Key Building Elements:** Design of singly and doubly reinforced rectangular and flanged beams, lintel, continuous beam, one-way and two-way slabs, staircases; short and slender columns subjected to axial load, uni-axial and biaxial bending moments; reinforced concrete walls; members in direct tension, and members subjected to bending and direct tension; spread

footings for walls, isolated or independent footings for columns; Basement wall.

- **Practical Detailing the Reinforcement:** Detailing of slabs, beams, off-set columns, joints; Detailing the member with a change in direction, edge beams, support points, corners of wall; Beams or girders intersection joints (Grid-joints); Beams and column joints (Rigid-frame joints); Corner joints; Exterior and interior joints.
- **Design Aids:** Maximum positive and negative bending moments, and reactions in multi-span continuous-beams; Moment resisting capacity of singly reinforced rectangular beams; Design of singly reinforced rectangular beam for the given ultimate moment; Values of p_t and p_c for the doubly reinforced rectangular beam sections for the given M_u/bd^2 ; Spacing of two-legged stirrups for given value of shear per unit depth; Design column interaction diagrams.
- **Steel Properties:** Area of group of reinforcing standard bars; Number of standard reinforcing bars for the given area; Areas of bars in reinforcement mesh, e.g., slab reinforcement; Perimeter of group of reinforcing bars; Area, perimeter, mass and mass of steel for specified spacing of bars.

DISTINGUISHING FEATURES

- Provides a large number of clear cut diagrams.
- Includes Review questions and Tutorial problems at the end of each chapter.
- Gives time saving analysis and design aids in the form of tables and charts.
- Emphasizes on clarity of concepts and development of structural sense needed for proper detailing.
- Covers working stress design method in the appendix.

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 2009 / 532 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3048-1 / Rs. 325.00

GHOSH

Foundation Design in PracticeKARUNA 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 2009 / 340 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3588-2 / Rs. 295.00

GHOSH

Numerical Methods with Computer Programs in C++ (with CD-ROM)PALLAB GHOSH, *Assistant Professor in the Department of Chemical Engineering, IIT Guwahati.*

Today, C++ is gaining prominence as a programming language and is emerging as a preferred choice of programmers because of its many attractive features and its user-friendly nature. And this text, intended for undergraduate students of engineering as well as for students of Mathematics, Physics and Chemistry, shows how numerical methods can be applied in solving engineering problems using C++. The text, while emphasizing the application aspects, also provides deep insight into the development of numerical algorithms.

KEY FEATURES

- Gives detailed step-by-step description of numerical algorithms and demonstrates their implementation. Each method is illustrated with solved examples.
- Provides C++ programs on many numerical algorithms. Elementary problems from various branches of science and engineering are solved.
- Contains 79 programs written in C++.
- Provides about 200 solved examples which illustrate the concepts.
- The Exercise problems, with various categories like Quiz, Analytical and Numerical Problems and Software Development Projects, drill the students in self-study.
- The accompanying **CD-ROM** contains all the programs given in the book.

Students as well as programmers should find this text immensely useful for its numerous student-friendly features coupled with the elegant exposition of concepts and the clear emphasis on applications.

CONTENTS: Preface. C++ and Object-Oriented Programming. Accuracy and Stability in Numerical Computing. Solution of Simultaneous Linear Algebraic Equations. Solution of Nonlinear Equations. Eigenvalues and Eigenvectors of Matrices. Statistical Analysis of Data. Curve Fitting. Sorting of Data. Approximation of Functions. Interpolation. Numerical Integration. Numerical Differentiation. Solution of Ordinary Differential Equations: Initial Value Problems. Solution of Ordinary Differential Equations: Boundary Value Problems. Numerical Solution of Partial Differential Equations. Appendix. Suggested Further Reading. Index.

Latest Print 2009 / 648 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2987-4 / Rs. 395.00

HAMMER & HAMMER, Jr.
**Water and Wastewater Technology,
 6th ed.**

MARK J. HAMMER • MARK J. HAMMER, Jr.

A proven text in the field of water and wastewater engineering and technology, this primer provides thorough coverage of the fundamental principles and current practices in water processing, water distribution, wastewater collection, wastewater treatment, sludge processing, and water reuse. All major systems and operations are covered concisely yet comprehensively and are reinforced with numerous examples and sample calculations.

The introductory chapters give a review of pertinent aspects of chemistry, biology, hydraulics and hydrology, and prepare the students for the subsequent material on water supply, wastewater disposal, and water quality.

The sixth edition updates the subject matter, illustrations, and problems to incorporate new concepts and issues related to the water environment. In this edition, the revision of text and addition of new problems are in the chapters on:

- Water distribution systems
- Water processing
- Wastewater processing
- Advanced wastewater treatment
- Water reuse

The book is appropriate for undergraduate level civil engineering courses in Environmental Engineering/Technology, Water Supply and Sanitation, and Water Quality Control. It is also suitable for two-year college/university courses in Environmental Studies.

CONTENTS: Preface. Acknowledgments. Introduction. Chemistry. Biology. Hydraulics and Hydrology. Water Quality. Water Distribution Systems. Water Processing. Operation of Waterworks. Wastewater Flows and Characteristics. Wastewater Collection Systems. Wastewater Processing. Wastewater Systems Capacity, Management, Operation, and Maintenance. Advanced Wastewater Treatment. Water Reuse. Appendix. Index.

**Latest Print 2009 / 564 pp. / 20.0 × 25.0 cm
 ISBN-978-81-203-3499-1 / Rs. 395.00**

HAVLIN, et al.
**Soil Fertility and Fertilizers:
 An Introduction to Nutrient
 Management, 7th ed.**

JOHN L. HAVLIN, *North Carolina State University.*

JAMES D. BEATON, *Retd. from Potash and Phosphate Institute.*

SAMUEL L. TISDALE, *Late President, The Sulphur Institute.*

WERNER L. NELSON, *Late Sr. V.P. Potash and Phosphate Institute.*

This classic textbook on soil fertility, fertilizers, and plant nutrition has taken the test of time for half a century so far. This *Seventh Edition* with an emphasis on environmental impact is the most comprehensive treatise on soil fertility and nutrient management on the market today. The text presents the chemical, biological, and physical basis and interactions influencing nutrient availability in soils. This book is eminently suitable for students of agriculture pursuing courses in Agronomy and Chemistry.

FEATURING

- An expanded discussion of nutrient uptake and absorption mechanism in roots and cells
- New information on contemporary tools and techniques to evaluate nutrient availability in the field
- Improved and increased focus on the impact of N and P use on water quality
- Many new graphics and photos to aid in reader understanding
- New qualitative and quantitative study questions have been added to the end of each chapter.

CONTENTS: Preface. Introduction. Basic Soil-Plant Relationships. Soil Acidity and Alkalinity. Nitrogen. Phosphorus. Potassium. Sulfur, Calcium, and Magnesium. Micronutrients. Soil Fertility Evaluation. Basics of Nutrient Management. Nutrients, Water Use, and Other Interactions. Economics of Plant-Nutrient Use. Agricultural Productivity and Environmental Quality. Index.

**Latest Print 2006 / 528 pp. / 17.8 × 23.5 cm
 ISBN-81-203-3017-X / Rs. 350.00**

HENRY & HEINKE Environmental Science and Engineering, 2nd ed.

J. GLYNN HENRY, *Professor Emeritus of Civil Engineering, University of Toronto and President, J.G. Henry Associates Ltd., Consulting Environmental Engineers.*

GARY W. HEINKE, *Professor of Civil Engineering, University of Toronto.*

Designed as an introductory-level core textbook on environmental science and engineering for students of engineering as well as for non-engineering undergraduates offering courses in environmental science, this book provides an in-depth analysis of the subject. This updated second edition is a result of the wide acceptance of the first edition and is based on the feedback and constructive comments received from the students and faculty on the previous edition. It has contributions from experts in the field—drawn both from the academic field and from the industry.

The book is divided into three parts: *Part I: Causes of Environmental Problems* gives updated data on increasing population, urbanization, energy use and the consequences of natural and human environmental disturbances, sustainable development and preventive technology. *Part II: The Scientific Background* includes a review of physics and chemistry, with additional information on atmospheric sciences, climatology, meteorology and epidemiology. *Part III: Technology and Control* provides current information on water use, drinking water standards, and alternative wastewater treatment. It also includes discussion on biosolids management, water resources, water supply, and water pollution and air pollution sources. New case studies and site remediation techniques are integrated with chapters on solid and hazardous wastes.

The book is enriched with over 300 problems and examples making it an ideal text for students. Besides, it would prove useful to the practising engineers and the teaching community.

CONTENTS: Preface. About the Authors and Contributors. Part 1: Causes of Environmental Problems—The Nature and Scope of Environmental Problems. Population and Economic Growth. Energy Growth. Natural Environmental Hazards. Human Environmental Disturbances. Part 2: Scientific Background—Physics and Chemistry. Atmospheric Sciences. Microbiology and Epidemiology. Ecology. Part 3: Technology and Control—Water Resources. Water Supply. Water Pollution. Air Pollution. Solid Wastes. Hazardous Wastes. Environmental

Management. Appendices—A. Symbols, Dimensions, and Units. B. Physical Properties and Constants. C. Abbreviations and Symbols. D. Special Environmental Problems. Index.

**Latest Print 2009 / 800 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2605-7 / Rs. 395.00**

JAGADEESH & JAYARAM 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 2009 / 360 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3852-4 / Rs. 325.00

KARIA & CHRISTIAN

Wastewater Treatment: Concepts and Design Approach

G.L. KARIA, *is former Assistant Professor, Department of Civil Engineering, S.V. National Institute of Technology, Surat.*

R.A. CHRISTIAN, *is Assistant Professor, Department of Civil Engineering, S.V. National Institute of Technology, Surat and is also a research guide at the institute.*

Featuring a systematic approach, this book 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.

DISTINCTIVE FEATURES

- Numerous examples supported by a good number of figures and sketches are provided to highlight the various design concepts of wastewater treatment units.
- Significant theoretical and computational information and useful design hints are encapsulated in **Note** and **Tip** boxes.
- Well-graded practice exercises are offered to help students develop the skills in designing treatment plants.

This concise and well-designed book fulfils the needs of the students of civil engineering and environmental engineering for a course in wastewater engineering. It will also be a great help to the practising professionals involved in the design of wastewater 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. Design of Aerobic Biological Treatment Units: Attached Growth Processes. Anaerobic Biological Wastewater Treatment. Design of Sludge Treatment Units. Appendixes. References. Index.

Latest Print 2008 / 380 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2860-0 / Rs. 325.00

KHAN

Textbook of Geotechnical Engineering, 2nd ed.

IQBAL H. KHAN, *is Professor Emeritus in the Department of Civil Engineering, Jamia Millia Islamia, New Delhi.*

This revised and enlarged Second Edition is a result of the positive feedback and constructive suggestions received from academics and students alike on the first 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 edition, the book consolidates on the subject, bringing in new areas of interest and concern.

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.

WHAT'S NEW TO THIS EDITION

- A new chapter covering various aspects of Environmental Geotechnology. This has become necessary since geotechnology has extensive applications in environment management, for example, solid waste management.
- Computer programs are included wherever these were found essential in making calculations.
- Numerous Objective Type Questions are provided in the Appendix to enable students to comprehend the topics with ease.

KEY FEATURES

- Contains plenty of worked-out numerical examples.
- Gives 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. Multiple-Choice Questions. Answers. Bibliography. Index.

**Latest Print 2009 / 476 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-2642-2 / Rs. 325.00**

KHISTY & LALL

Transportation Engineering: An Introduction, 3rd ed.

C. JOTIN KHISTY, *Illinois Institute of Technology, Chicago.*

B. KENT LALL, *Portland State University, Portland.*

This book offers a detailed, current and interdisciplinary introduction to transportation engineering, planning, and management. The primary audience for this textbook is undergraduate and postgraduate students in civil engineering, as well as those in urban planning, economics, management, and other related disciplines. Professionals working in the field of transportation would also find this book useful. It is a thoroughly updated edition incorporating material from the latest Highway Capacity Manual 2000, as well as the AASHTO Manual.

While numerical problem solving has been emphasized, the need to substantiate these numerical results, buttressed by proper explanations and discussions, has been duly illustrated. Several exercises at the end of chapters are the open-ended type questions requiring creativity and critical thinking.

CONTENTS: Preface to the Third Edition. Preface to the First Edition. Transportation as a System. Transportation Economics. The Land-Use/Transportation System. Vehicle and Human Characteristics. Traffic Flow Characteristics. Geometric Design of Highways. Highway Capacity. Intersection Control and Design. At-Grade Intersection Capacity and Level of Service. Public Passenger Transportation. Urban Transportation Planning. Local Area Traffic Management. Energy Issues Connected with Transportation. TSM Planning: Framework. Evaluation of Transportation Improvement. Transportation Safety. Appendixes: A—Elements of Engineering Economics. B—Application of Probability and Statistics. C—General Statistics on Transportation System and Use in United States. D—Conversion Tables for Units of Measurement. Index.

**Latest Print 2009 / 840 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2212-7 / Rs. 450.00**

LO & YEUNG

Concepts and Techniques of Geographic Information Systems, 2nd ed.

C.P. LO, *University of Georgia, Athens, Georgia, U.S.A.*
ALBERT K.W. YEUNG, *Ontario Police College, Aylmer, Ontario, Canada.*

This book provides a rigorous and balanced treatment of Geographic Information Systems (GIS) concepts and techniques in a single volume. It is suitable for Geographic Information Systems courses held in departments of Geography or Anthropology.

Fully updated to reflect advances in GIS concepts and techniques, this text approaches the subject from the broader context of information technology. Complete, up-to-date coverage is given to the concepts and techniques pertaining to every stage of the systems development life cycle of GIS, as well as its applications to various areas of spatial problem solving and decision making.

The text

- Emphasizes GIS and mainstream IT integration; explores new spatial analysis techniques/landscape metrics; expands discussion of geovisualization; examines new terrain data acquisition by LiDAR and covers emerging technology in mobile computing and location-based services.
- Covers topics that are often not adequately covered in other GIS texts—Includes the principles and practice of information resource management, information system development methodology, spatial database modeling and design, and more.
- Emphasizes on spatial modeling and modeling with examples of application—Shows students how to correctly use GIS to solve problems.
- Includes full discussion on data quality and data standard and detailed and up-to-date references.
- Has two useful appendices—Includes Internet Resources and a GIS glossary.
- Gives a summary, and review questions are added to each chapter.
- Contains numerous figures and diagrams.

CONTENTS: Introduction to Geographic Information Systems (GIS). Maps and Geospatial Data. Digital Representation and Organization of Geospatial Data. Geospatial Data Quality and Standards. Raster Geoprocessing. Vector Geoprocessing. Geovisualization and Geospatial Information Products. Remote Sensing and GIS Integration. Digital Terrain Modeling. Spatial Data Analysis, Modeling, and Mining. GIS Implementation and Project Management. GIS Issues and Prospects. Appendix A: Internet Resources for

GIS. Appendix B: Glossary of GIS Terms. Photo and Figure Credits. Index.

Latest Print 2009 / 544 pp. / 21.6 × 27.8 cm
ISBN-978-81-203-3914-9 / Rs. 450.00

MAJUMDAR

Irrigation Water Management: Principles and Practice

DILIP KUMAR MAJUMDAR, *Professor of Agronomy, Institute of Agriculture, Visva-Bharati University.*

This book fills 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 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 has an extensive glossary, whilst a detailed bibliography concludes each chapter.

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. Appendices. Glossary. Index.

Latest Print 2009 / 500 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-1729-1 / Rs. 325.00

MASTERS & ELA

Introduction to Environmental Engineering and Science, 3rd ed.

GILBERT M. MASTERS and WENDELL P. ELA.

The third edition of this book has been completely updated, modestly expanded and significantly strengthened—especially in the area of water quality engineering. The revisions have been made with the aim of providing students with the necessary tools

and understanding of topics in chemistry, water treatment, air pollution and solid waste components. The text maintains its accessibility to non-engineering and hard science students as well. This blend of technical rigour and broad accessibility has been a goal of the previous editions and it continues to be an explicit objective of this edition too. Designed for use in undergraduate courses on environmental engineering and science.

NEW TO THIS EDITION

1. More Applied Applications—Greenhouse Gases, Hurricane Katrina, Global Warming
2. Inclusion of Plug Flow Discussion
3. Added Discussions on Topics—Deforestation, Soil Erosion, Species Extinction

CONTENTS: Preface. Mass and Energy Transfer. Environmental Chemistry. Mathematics of Growth. Risk Assessment. Water Pollution. Water Quality Control. Air Pollution. Global Atmospheric Change. Solid Waste Management and Resource Recovery. Appendices—A: Useful Conversion Factors. B: Atomic Numbers and Atomic Weights. C: Density and Viscosity of Water and Air. D: Useful Constants. Index.

Latest Print 2008 / 720 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3691-9 / Rs. 350.00

MEENAKSHI

Elements of Environmental Science and Engineering

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 2009 / 324 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2774-0 / Rs. 195.00

MOHANTY

Fluid Mechanics, 2nd ed.

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

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

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

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

CONTENTS: Preface. Preface to the First Edition. Introduction. Fluid Statics. Fluid Kinematics. Analysis of Finite Control Volumes. Mechanical Energy Equation. One-Dimensional Viscous Flow. Dimensional Analysis. Two-Dimensional Flow of Ideal Fluids. Two-Dimensional Viscous Flow. Laminar Boundary Layers.

Turbulent Flow. Introduction to Compressible Flows. One-Dimensional Compressible Flows. Normal and Oblique Shocks. Fluid Machines. Hydraulic Turbines. Pumps and Fans. Open Channel Flow. Hydraulic Transients. Flow Measurements. Appendix. Suggested Further Reading. Index.

Latest Print 2009 / 540 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-0894-7 / Rs. 275.00

NAG

Analytical Techniques in Agriculture, Biotechnology and Environmental Engineering

A. NAG, *Department of Chemistry, Indian Institute of Technology Kharagpur.*

This book, with contributions from eminent academicians from India and abroad, focuses on the methodology adopted for determining different types of parameters necessary for the design, analysis and monitoring of various activities in agriculture, biotechnology and environmental engineering. With the advancement in life sciences and modern technology and the increased applications of this technology, the development of concepts, techniques and instrumentation are so essential for these fields. And this compact and concise text describes such methods and instrumental techniques in an easy-to-read style. The text describes in detail such topics as instrumental techniques—Chromatography methods, Electrophoresis methods, Instrumental techniques in chemical analysis, and chemical estimation—environmental pollution, and biological techniques.

This compact and concise text, dealing with different experiments and techniques used in agriculture, biotechnology and environmental engineering, should be of immense interest to undergraduate and postgraduate students in these disciplines as well as to researchers.

CONTENTS: Preface. Presentation of Scientific Results and Safety in Laboratory. Chromatography Methods. Electrophoresis Method. Gene Cloning. Animal Tissue Culture. Plant Tissue Culture. Estimation Experiments. Seed Testing. Soil and Plant Analysis. Waste Water Analysis. Air Pollution Measurement. Noise Pollution and Its Measurement. Instrumental Techniques in Chemical Analysis. Bibliography. Index.

Latest Print 2006 / 184 pp. / 16.0 × 24.1 cm
ISBN-81-203-2957-0 / Rs. 175.00

NATHANSON

**Basic Environmental Technology:
Water Supply, Waste Management,
and Pollution Control, 5th ed.**JERRY A. NATHANSON, *Union County College, Cranford,
New Jersey.*

This text offers a practical introduction to a wide range of environmental topics, focusing primarily on water and wastewater, solid and hazardous waste, and air and noise pollution control. It emphasizes fundamental concepts and basic applications so that students with little or no experience in biology, chemistry, geology, or hydraulics can comprehend this book.

KEY FEATURES:

- A clear easy-to-read style
- Presentation of mathematical topics at a relatively basic level
- Hundreds of example problems, diagrams, and photographs
- Numerous chapter review questions and practice problems
- Use of both SI and U.S. customary units
- An appendix containing a basic math review.

New to this edition:

- A revised and expanded section about on-site wastewater disposal
- A new section about alternative wastewater collection systems
- A new section on wastewater treatment plant operation and maintenance
- Additional case studies and examples of Geographic Information Systems (GIS) applications
- Highlighted key terms and an expanded glossary
- End-of-chapter summaries

"The text is well designed, current, and has excellent figures, illustrations, and examples."

—MICHAEL D. TURNER
Northeastern State University,
Tahlequah, Oklahoma

CONTENTS: Basic Concepts. Hydraulics. Hydrology. Water Quality. Water Pollution. Drinking Water Purification. Water Distribution Systems. Sanitary Sewer Systems. Stormwater Management. Wastewater Treatment and Disposal. Municipal Solid Waste. Hazardous Waste Management. Air Pollution and Control. Noise Pollution and Control. Appendixes—A: Environmental Impact Studies and Audits. B: Role of the Technician and the Technologist. C: Review of Basic Mathematics, Units, and Unit Conversions. D: Glossary and Abbreviations. E: Selected References,

Software, and Video Resources. F: Answers to Practice Problems. G: Color Photographs. Index.

**Latest Print 2009 / 548 pp. / 21.6 × 27.8 cm
ISBN-978-81-203-3836-4 / Rs. 525.00**

**PAPACOSTAS & PREVEDOUROS
Transportation Engineering and
Planning, 3rd ed.**C.S. PAPACOSTAS & P.D. PREVEDOUROS, *both of
University of Hawaii at Manoa, Honolulu, Hawaii.*

This popular text uses an enriched and interdisciplinary approach to introduce transportation engineering. Besides emphasizing the fundamentals of pure sciences, mathematics, and engineering mechanics, the text incorporates new concepts in societal context, geometric design, human factors, traffic engineering through to simulation, transportation planning, and evaluation.

Featuring latest developments on transportation infrastructure, it offers state-of-the-art knowledge on the subject. The text weaves the wide spectrum of coverage ranging from basic engineering principles through to applications, implications, and forecasting into four sections—

- Design and Operation
- Transportation Systems
- Transportation Impacts
- Supporting Elements

With all the innovative learning aids, the book will prove to be a valuable instructional tool for the students and professionals in civil and transportation engineering.

CONTENTS: Preface. Introduction and Background. Part 1: DESIGN AND OPERATION—Roadway Design. Traffic Stream Flow Models. Capacity and Level of Service Analysis—Part 2: TRANSPORTATION SYSTEMS—Transportation Modes. Urban and Intelligent Transportation Systems. Transportation Planning. Travel-Demand Forecasting. Part 3: TRANSPORTATION IMPACTS—Traffic Impact and Parking Studies. Air Quality, Noise, and Energy Impacts. Evaluation and Choice. Part 4: SUPPORTING ELEMENTS—Elements of Engineering Economy. Probability and Statistics. Queuing and Simulation. Transportation Software. Appendix A—1982 Guidelines for the Preparation of Environmental Documents. Index.

**Latest Print 2009 / 704 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2154-0 / Rs. 395.00**

PATWARDHAN

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 2009 / 304 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-3350-5 / Rs. 275.00**

PRASAD

Fundamentals of Soil Dynamics and Earthquake Engineering

BHARAT BHUSHAN PRASAD, *Professor and Head of Civil Engineering, Krishna Institute of Engineering and Technology, Ghaziabad.*

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 2009 / 584 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2670-5 / Rs. 450.00**

QASIM, MOTLEY & ZHU
**Water Works Engineering: Planning,
 Design & Operation**

SYED R. QASIM, *The University of Texas at Arlington*.
 EDWARD M. MOTLEY and GUANG ZHU, *Chiang, Patel &
 Yerby, Inc.*

This text is an end-to-end presentation of the state-of-the-art in planning, design, and operations of water treatment facilities.

Developed with a two-fold intent, it elucidates the basic principles, policies, and developments in recent water treatment technologies. Then, it cultivates step-by-step planning, design, and operational methodologies that are requisites for setting up medium-size conventional plants.

With ample illustrations and a simplified format, this book caters to the needs of civil and environmental engineering disciplines.

CONTENTS: Preface. Acknowledgments. Introduction. Water Quality. Water Treatment Processes. Basic Design Considerations. Predesign Report and Problem Definition for the Design Example. Raw Water Intake, Screening, and Aeration. Water Conveyance, Flow Measurement, and Pumping. Coagulation, Flocculation, and Precipitation. Sedimentation. Filtration. Color, Taste, and Odor Control. Disinfection and Fluoridation. Water Stability, Clearwell, High-service Pumps, and Distribution System. Residuals Processing and Disposal. Plant Siting, Layout, Yard Piping, and Hydraulic Profile. Process Control. Design Summary. Nonconventional Water Treatment Processes and Designs. Avoiding Design Errors. Appendices. Index. About the Authors.

Latest Print 2009 / 864 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2153-3 / Rs. 450.00

RAJASEKARAN & SANKARASUBRAMANIAN
Computational Structural Mechanics
 (with CD-ROM)

S. RAJASEKARAN, *Professor Emeritus* and
 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 2009 / 796 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-1734-5 / Rs. 425.00

RAMAMURTHY (Ed.)
**Engineering in Rocks for Slopes,
 Foundations and Tunnels**

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 undergraduate 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.

What distinguishes the text is the application of numerical methods to solve various problems by discrete element and equivalent material concepts, interpretation of geomechanics modelling test data, excavation methods, ground improving methods, and use of roadheaders and TBMs.

The book provides an excellent understanding of how to solve problems in rock engineering and should immensely benefit 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 2008 / 752 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3275-1 / Rs. 550.00

RANA

Essentials of Ecology and Environmental Science, 4th ed.

S.V.S. RANA, Professor in the Department of Zoology and also the Coordinator of the Department of Environmental Science as well as the UGC-Innovative Assistance Programme in Toxicology at Chaudhary Charan Singh University, Meerut.

This book, now in its fourth 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 2009 / 584 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-3894-4 / Rs. 295.00

RATHAKRISHNAN

Fluid Mechanics: An Introduction, 2nd ed.

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

The **second edition** of this extensively revised and updated text provides a comprehensive introduction to the fundamentals and principles governing the science of fluid mechanics. Assuming only basic knowledge of calculus and physics, the students are exposed to the various physical phenomena of fluid mechanics in a clear and effective manner. The text helps students grasp the material by demonstrating the application of theory to fundamental engineering problems.

The Second Edition features:

- Completely revised Chapter 2 to include expanded coverage of potential flow theory, Vortex motion, and pipe flow.
- A new chapter (Chapter 4) on boundary layer theory.
- An increase in the number of solved examples, and an abundance of chapter-ending problems with answers.
- A companion **Solutions Manual** for instructors.

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

CONTENTS: Preface. Preface to the First Edition. Some Basic Facts About Fluid Mechanics—General Description. Fluids and the Continuum. Dimensions and Units. Law of Dimensional Homogeneity. The Perfect Gas: Equation of State. Regimes of Fluid Mechanics. Fluid Statics. Fundamentals of Fluid Mechanics—Introduction. Properties of Fluids. Thermodynamic Properties. Surface Tension. Analysis of Fluid Flow. Basic and Subsidiary Laws for Continuous Media. Kinematics of Fluid Flow. Stream

Function. Potential Flow. Combination of Simple Flows. Flow Past a Circular Cylinder. Viscous Flows. Gas Dynamics. Dimensional Analysis and Similarity—Introduction. Dimensionless Groups. Dimensional Homogeneity Principle. Buckingham's π -theorem. Dimensionless Group in Fluid Dynamics. Calculation of the Dimensionless Groups. Similarity. Relationship Between Dimensional Analysis and Similarity. Similarity Requirements from the Equations of Flow. Scale Factors. Boundary Layer—Introduction. Boundary Layer Development. Boundary Layer Thickness. Boundary Layer Flow. Boundary Layer Solutions. Momentum-Integral Estimates. Boundary Layer Equations. Flat Plate Boundary Layer. Turbulent Boundary Layer for Incompressible Flow Along a Flat Plate. Flows with Pressure Gradient. Laminar Integral Theory. Bibliography. Index.

Latest Print 2009 / 256 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-3183-9 / Rs. 195.00

ROY

Fundamentals of Surveying

S.K. ROY, *Department of Civil Engineering, Bengal Engineering College, Howrah.*

The primary objective of the author is to present an introductory textbook for the first course in surveying suitable for students of civil engineering, architecture, and allied professional courses. Modern surveying involves the use of sophisticated scientific instruments, mathematical methods and computational techniques. This book therefore comprehensively explains the principles of surveying instruments and derivation of mathematical formulae.

This is an updated textbook with lucid presentation. It is a very useful and practical book and bears a testimony to the vast teaching experience of the author. The materials in the text have been culled from numerous lectures on the subject, reference books and professional journals and presented in a reader-friendly manner.

More than 130 fully solved examples, which include questions generated from premier institutes in the UK and the institution of Civil Engineers (UK) are included in the text.

CONTENTS: Preface. Introduction. Errors in Measurement. Measurement of Horizontal Distances. Electronic Distance Measurements. Levelling-I. Levelling-II. Permanent Adjustment 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. Answers to Problems. Bibliography. Index.

Latest Print 2009 / 620 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-1260-9 / Rs. 295.00

SASIKUMAR & GOPI KRISHNA 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 and governmental as well as commercial institutions 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: 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.

320 pp. (approx.) / 16.0 × 24.1 cm
ISBN-978-81-203-3869-2 / Forthcoming

SCHODEK & BECHTHOLD Structures, 6th ed. (with CD-ROM)

DANIEL L. SCHODEK and MARTIN BECHTHOLD.

This text covers all major topics of structural analysis in both a qualitative and quantitative manner. An effective teaching tool for many courses at both undergraduate and postgraduate levels, it is also a useful resource for architects, constructors, and engineers. The presentation of physical principles founded in the field of mechanics can be used by designers and builders to understand the behavior of existing structural forms and in devising new approaches.

New to this edition:

- Improved illustrations and photos that clarify complex concepts
- A revised accompanying CD with images and additional exercises

“This book is well-organized and covers all necessary structure-related topics. It is well-written and technically very accurate.”

— SUSAN FARAJI
University of Massachusetts, Lowell

CONTENTS: Part 1: INTRODUCTORY CONCEPTS—Structures: An Overview. Principles of Mechanics. Introduction to Structural Analysis and Design. Part 2: ANALYSIS AND DESIGN OF STRUCTURAL ELEMENTS—Trusses. Funicular Structures: Cables and Arches. Beams. Members in Compression: Columns. Continuous Structures: Beams. Continuous Structures: Rigid Frames. Plate and Grid Structures. Membrane and Net Structures. Shell Structures. Part 3: PRINCIPLES OF STRUCTURAL DESIGN—Structural Grids and Patterns: General Planning and Design. Structural Systems: Design for Lateral Loadings. Structural Systems: Constructional Approaches. Structural Connections. Index.

Latest Print 2009 / 640 pp. / 21.6 × 27.8 cm
ISBN-978-81-203-3830-2 / Rs. 450.00

SENGAR Environmental Law (with CD-ROM)

DHARMENDRA S. SENGAR, *Professor of Legal Management and Chairman, Legal Management Group, Indian Institute of Management (IIM) Lucknow.*

Today, more than ever before, there is considerable concern about the deterioration of the environment

arising from environmental pollution—water, air, noise, radiation and others. For, such pollution has a huge adverse impact on human health, and the hazards it poses are too numerous. There is also a felt-need for environmental protection and management and effective implementation of environmental laws. This comprehensive book, authored by Prof. Sengar, an eminent academic, with his wealth of experience in various areas of environmental law and management, brings these issues into sharp focus.

The book highlights problems such as public health and safety, right to carry on trade vis-à-vis duty to protect environment, right to information about hazardous installations, right to clean environment, and ecological balance for **sustainable development**. It stresses the need for striking a balancer between environment and development to bring about sustainable development. Finally, the text shows how important it is to formulate a legal framework for environmental protection.

KEY FEATURES

- While giving a broad conceptual overview of environmental law, the text explains the major environmental laws, examines the relevant provisions, and traces the origin of constitutional support to environmental protection.
- Refers to **all leading cases** on environmental law and highlights the role of judiciary on entertaining as well as restraining public interest litigations (PILs) to stop environmental violations.
- Provides Appendices containing various environmental laws.
- The accompanying **CD-ROM** contains text of all relevant environmental laws—both general and specific—to help readers have access to those laws instantly.

Primarily intended as a text for students of law (LL.B./BA LL.B./LL.M., MBL) and management (MBA), the book should also prove to be an excellent reference for academics, lawyers, judges, environmental activists, environmental managers and corporates concerned with environmental protection.

CONTENTS: Preface. Acknowledgements. List of Cases. Introduction. Industrial Pollution: Causes and Consequences. Legal Control of Hazardous Substances and Processes. Law Relating to Water Pollution. Industrial Air Pollution and Law. Enforcement Machinery. Environmental Issues and Judicial Trend. Corporate Environmental Liability. Bibliography. Selected Environmental Statutes. Specific Environmental Legislations and Their Amendments. Appendices. Index.

Latest Print 2009 / 376 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-3059-7 / Rs. 275.00

SESHU

Textbook of Finite Element Analysis

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

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

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

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

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

Latest Print 2009 / 340 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2315-5 / Rs. 250.00

SHAH

Numerical Methods with C++ Programming

NITA H. SHAH, *Reader in the Department of Mathematics, Gujarat University. She is a post-doctoral fellow from University of New Brunswick, Canada and is visiting faculty at various universities.*

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 an 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 / Rs. 275.00

SHESHA PRAKASH & MOGAVEER

Elements of Civil Engineering and Engineering Mechanics

M.N. SHESHA PRAKASH, *Professor in the Department of Civil Engineering, Jawaharlal Nehru National College of Engineering, Shimoga since 1996.*

GANESH B. MOGAVEER is *Associate Professor and Head of Civil Engineering Department, Vivekananda College of Engineering and Technology, Puttur.*

Student-friendly in approach, this book focuses on introductory coverage of basics of **civil engineering** and **engineering mechanics** to provide students with a balanced and cohesive study of these two areas as needed by them in the beginning of their engineering education. It is a basic undergraduate

textbook for first-year students of all branches of engineering, though especially designed to conform to the syllabus of Visvesaraya Technological University (VTU).

The book imparts basic knowledge in various facets of civil engineering and the related engineering structures and infrastructure such as buildings, roads, highways, dams and bridges, inter alia, emphasizing the role and responsibilities of a civil engineer in modern society. It also briefly explains the broad scope of allied fields of civil engineering such as surveying, transportation, water resources, environmental engineering, geotechnical engineering, foundation engineering, and construction technology.

The Engineering Mechanics portion of the book is comprehensively covered in eight chapters—divided into topics on Forces, Centroid, Moment of Inertia and Friction. Each chapter introduces the concepts to the reader gradually and stepwise. Providing a wealth of practice examples, the book emphasizes the importance of building strong analysis skills. Practice problems at the end of each chapter give students opportunities to absorb concepts and hone their problem-solving skills.

This book has a companion CD containing software, developed using MS Excel, to work out the problems on Forces, Centroid, Friction and Moment of Inertia. It would help faculty to develop new kind 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 relatively better way. They will also be able to compare answers with those obtained using manual procedures.

CONTENTS: Preface. Acknowledgements. Introduction to Civil Engineering. Introduction to Engineering Mechanics. Coplanar Concurrent Force System. Coplanar Non-concurrent Force System. Equilibrium of Coplanar Concurrent Force System. Equilibrium of Coplanar Non-concurrent Force System. Centroid of Plane Figures. Moment of Inertia. Friction. Examination Papers of VTU. Objective Type Questions. Index.

Latest Print 2009 / 264 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3700-8 / Rs. 225.00

SINCERO & SINCERO
Environmental Engineering:
A Design Approach
 (with Diskette)

ARCADIO P. SINCERO, *Morgan State University.*
 GREGORIA A. SINCERO, *Maryland Department of the Environment.*

This comprehensive textbook dealing with environmental engineering provides a thorough treatment of the subject in all its aspects—water and wastewater, environmental hydrology, hydraulics and pneumatics, air, solid waste, noise and environmental quality modeling. The text makes use of practical hands-on examples and current applications.

KEY FEATURES

- In-depth coverage of the applications of chemical reactions is included.
- Example problems illustrate the techniques of design using the concepts presented in the text.
- Treats surface water, subsurface water and air quality modeling as part of the concept of conservation of mass.
- Provides a unified approach to the concept of settling and cake filtration, treating and settling of air and water together.

CONTENTS: Preface. Acknowledgments. About the Authors. Introduction. Environmental Chemistry and Biology. Environmental Engineering Hydrology. Environmental Engineering Hydraulics and Pneumatics. Introduction to Environmental Quality Modeling. Conventional Water Treatment. Conventional Wastewater Treatment, Sludge Treatment and Disposal. Advanced Wastewater and Water Treatment and Land Treatment Systems. Pollution from Combustion and Atmospheric Pollution. Solid Waste Management. Air Pollution Control. Hazardous Waste Management and Risk Assessment. Noise Pollution and Control. Appendices. Index.

Latest Print 2008 / 816 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-1474-0 / Rs. 395.00

SINGH
Experiments in Fluid Mechanics

SARBJIT SINGH, *Assistant Professor in the Department of Civil Engineering at the Thapar University, Patiala.*

The aim of this book is to teach the students, how to conduct experiments in fluid mechanics. The book is designed for use by undergraduate students of several branches of engineering.

Thirty experiments have been selected from the syllabi of courses on Basic Fluid Mechanics and Advanced Fluid Mechanics. The first fifteen experiments are designed to be performed by the students of several branches of engineering who study fluid mechanics as a common course (Civil, Mechanical, Electrical, Instrumentation and Control, and Chemical Engineering). The remaining fifteen experiments are meant to be performed by the students of Civil Engineering and Mechanical Engineering who study another advanced course on Fluid Mechanics.

The book is divided into two parts. Part I allows the students to review the fundamental theory before stepping into laboratory environment. Part II provides the step-wise details of experiments which include objective, brief theory of the experiment, experimental set-up, procedure, observations and calculations, graphs to be plotted, and a concluding discussion of the experiment. Appendix A gives several 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 related standard values to be used in the 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 Experiment. 2. Calibration of Venturimeter. 3. Calibration of Orificemeter. 4. Determination of Coefficient of Friction. 5. Determination of Loss Coefficients for Pipe Fittings. 6. Verification of Momentum Equation. 7. Calibration of V-notch. 8. Determination of Hydrostatic Force. 9. Determination of Hydraulic Coefficients of Orifice. 10. Determination of Metacentric Height. 11. Drawing of Flow Net: Hele-Shaw Method. 12. Calibration of Rotameter. 13. Reynolds Experiment. 14. Free Vortex Flow. 15. Forced Vortex Flow. 16. Calibration of Current Meter. 17. Determination of Viscosity by Capillary Tube Viscometer. 18. Boundary Layer Formation Over a Flat Surface. 19. Flow Around a Cylinder Placed in Wind Stream. 20. Verification of Stoke's Law. 21. Velocity Distribution in Open Channel Flows. 22. Determination of Manning's Coefficient. 23. Free Overfall in a Rectangular Channel. 24. Calibration of Venturiflume. 25. Flow Through a Horizontal Contraction in a Channel. 26. Flow Over a Broad Crested Weir. 27. Hydraulic Jump in a Rectangular Channel. 28. Flow Over a Spillway. 29. Flow in a Pipe Bend. 30. Centrifugal Pump Test Rig. Appendix A. Appendix B.

Latest Print 2009 / 236 pp. / 21.6 × 28.0 cm
ISBN-978-81-203-3762-6 / Rs. 225.00

SOM & DAS

Theory and Practice of Foundation Design

N.N. SOM, *Professor of Civil Engineering, Jadavpur University, Kolkata.*

S.C. DAS, *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 2009 / 392 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2190-8 / Rs. 275.00

SRINIVASAN

Environmental Engineering

D. SRINIVASAN, *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 2008 / 440 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3600-1 / Rs. 325.00

VARGHESE

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 Prentice-Hall of India), 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.

WHAT'S NEW TO THIS EDITION

- Chapter 18 on Earthquake Forces and Structural Response of framed buildings has been completely revised and updated so as to conform to the latest I.S. Codes 1893 (2002) entitled Criteria for Earthquake Resistant Design of Structures (Part I - Fifth Revision).
- Chapters 19 and 21 which too deal with earthquake design have been revised.
- A Summary of elementary design of reinforced concrete members is added as Appendix.
- Valuable tables and charts are presented to help students and practising designers to arrive at a speedy estimate of the steel requirements in slabs, beams, columns and footings of ordinary buildings.

DISTINGUISHING FEATURES

- Presents codes of other countries, especially of USA and UK, and these are compared with the Indian Code, thus exposing the reader to international practices.
- Gives a large number of worked-out examples to illustrate the theory and to demonstrate their use in practical designs.
- Contains a number of typical detailing of reinforced concrete members, which will be of great help in field applications.
- Lecture based presentation with each chapter dealing with one lecture topic.

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—A. Calculation of Bending and Torsional Stiffness of Flanged Beams. B. Durability of Structural Concrete. C. Revision of Methods of Design of R.C. Members in Low Rise Buildings with Design Charts and Tables. Index.

Latest Print 2009 / 560 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2787-0 / Rs. 395.00

VARGHESE

Building Construction

P.C. VARGHESE, *Honorary Professor at Anna University, Chennai, was formerly Professor and Head, Department of Civil Engineering, IIT Madras.*

This book, a companion volume to the author's book on *Building Materials*, 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.

KEY FEATURES

- Separate Appendix is given to discuss earthquake-resistant design of buildings.

- Review Questions provided at the end of each chapter enable the readers recapitulate the topics.
- The references to IS codes and standards make the text suitable for further study and field use.
- Because of the lecture-based presentation of the subject, the text will be of considerable benefit for the young teachers for their classroom lectures.

CONTENTS: Foreword. Preface. Acknowledgements. Components of a Building and Building Specifications. Site Preparation and Setting Out of Works. Earthwork and Anti-termite 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 & 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 2009 / 472 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3083-2 / Rs. 325.00

VARGHESE

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 2009 / 292 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2848-8 / Rs. 225.00

VARGHESE

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 and UNESCO Chief Technical Advisor, University of Moratuwa, Colombo.*

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.

KEY FEATURES

- Explains IS Codes on the subject.
- Presentation of the book is lecture-based, with each chapter dealing with one topic. This helps the teachers in their lectures.
- Deals with modern concepts as well as empirical procedure.
- Devotes a separate chapter to the effects of earthquakes on foundations.
- Has a large number of diagrams to illustrate the concepts discussed.

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 Virendeel 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 2009 / 456 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3615-5 / Rs. 395.00

VARGHESE

Foundation Engineering

P.C. VARGHESE, *Honorary Professor at Anna University, Chennai, was formerly Professor and Head, Department of Civil Engineering, IIT Madras.*

Foundation Engineering is of prime importance to undergraduate and postgraduate students of civil engineering as well as to practising engineers. For, there is no construction—be it buildings (government, commercial and residential), bridges, highways, or dams—that does not draw from the principles and application of this subject. Unlike many textbooks on Geotechnical Engineering that deal with both Soil Mechanics and Foundation Engineering, this text gives an exclusive treatment and an indepth analysis of Foundation Engineering.

What distinguishes the text is that it not merely equips the students with the necessary knowledge for the course and examination, but 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.

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. These specializations coupled with over 50 years of teaching experience of the author make this text authoritative and exhaustive.

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.

KEY FEATURES

- Provides a lecture-based discussion of each topic, i.e. each lecture topic is given in one chapter.
- Each chapter has worked-out problems to illustrate the concepts discussed.
- BIS Codes are referred wherever found necessary.
- Simplified thumb rules are included, which are of great help to the practising engineers.

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 2009 / 592 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2652-1 / Rs. 425.00

VARGHESE

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 Prentice-Hall of India). 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 2008 / 580 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2039-0 / Rs. 295.00

VENUGOPALA RAO

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 2009 / 288 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-2893-8 / Rs. 225.00**

VENUGOPALA RAO

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 2009 / 280 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-1930-1 / Rs. 195.00**

VISSMAN, Jr. & LEWIS

Introduction to Hydrology, 5th ed.

WARREN VISSMAN, Jr., *University of Florida.*
GARY L. LEWIS, *Consulting Engineer.*

For the fifth edition, *Introduction to Hydrology* has been significantly revamped and restructured offering the reader content that is focused and streamlined. Many postgraduate level subjects and topics that were considered to be more of a handbook variety have been eliminated, in keeping with the original philosophy of the book which was to focus on

providing a scope of material that supports theory-to-practice learning experience for beginning students in hydrology. The sequencing of chapters is so designed as to lead students through the underlying principles of hydrology and then to introduce them to the world of applications.

Notable changes in this fifth edition include:

- The restructured and streamlined fifth edition consists of 13 chapters, whereas the fourth edition consisted of 27 chapters.
- The chapter on statistics has been moved to an early position in the book so as to introduce these techniques before they are applied to problems in later chapters.
- There are many new solved examples and homework problems.
- Web addresses useful for securing hydrologic data and relevant information to supplement the text have been added.

CONTENTS: Preface. Introduction. Hydrologic Measurements and Data sources. Statistical Methods in Hydrology. Precipitation. Interception and Depression Storage. Evaporation and Transpiration. Infiltration. Surface Water Hydrology. Hydrographs. Groundwater Hydrology. Urban Hydrology. Hydrologic Simulation and Streamflow Synthesis. Hydrology in Design. Appendixes. Index.

**Latest Print 2009 / 624 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3368-0 / Rs. 395.00**

WURBS & JAMES

Water Resources Engineering

RALPH A. WURBS, *Department of Civil Engineering, Texas A&M University, College Station, Texas.*

WESLEY P. JAMES, *H2WR, Inc., College Station, Texas.*

This text comprehensively offers a broad coverage of pertinent topics concerning water resource engineering and combines the fundamentals of hydraulics, hydrology, and water systems design and analysis.

It also details the application of engineering concepts and methods with a perspective crucial for human welfare, economic prosperity, and economic and environment vitality.

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