

Chemical Engineering Kinetics Smith 3rd Ed

Motivation for this Book Ontologies have received increasing attention over the last two decades. Their roots can be traced back to the ancient philosophers, who were interested in a conceptualization of the world. In the more recent past, ontologies and ontological engineering have evolved in computer science, building on various roots such as logics, knowledge representation, information modeling and management, and (knowledge-based) information systems. Most recently, largely driven by the next generation internet, the so-called Semantic Web, ontological software engineering has developed into a scientific field of its own, which puts particular emphasis on the theoretical foundations of representation and reasoning, and on the methods and tools required for building ontology-based software applications in diverse domains. Though this field is largely dominated by computer science, close relationships have been established with its diverse areas of application, where researchers are interested in exploiting the results of ontological software engineering, particularly to build large knowledge-intensive applications at high productivity and low maintenance effort. Consequently, a large number of scientific papers and monographs have been published in the very recent past dealing with the theory and practice of ontological software engineering. So far, the majority of those books are dedicated to the theoretical foundations of ontologies, including philosophical treatises and their relationships to established methods in information systems and ontological software engineering.

Based on the popular course of the same title, *Concepts of Chemical Engineering 4 Chemists* outlines the basic aspects of chemical engineering for chemistry professionals. It clarifies the terminology used and explains the systems methodology approach to process design and operation for chemists with limited chemical engineering knowledge. The book provides practical insights into all areas of chemical engineering, including such aspects as pump design and the measurement of key process variables. The calculation of design parameters, such as heat and mass transfer coefficients, and reaction scale-up are also discussed, as well as hazard analysis, project economics and process control. Designed as a reference guide, it is fully illustrated and includes worked examples as well as extensive reference and bibliography sections. *Concepts of Chemical Engineering 4 Chemists* is ideal for those who either work alongside chemical engineers or who are embarking on chemical engineering-type projects. "Updating the most comprehensive and complete guide to water treatment planning and design, this edition maintains the book's broad scope and reach, while reaching the working professional with additional worked problems and new treatment approaches. It covers both the principles and theory of water treatment as well as the practical considerations of plant design and distribution. The contents have been updated to cover changes to regulatory requirements, testing methodology, and design approaches, as well as the emergent topics of

pharmacological agents in the water supply and treatment strategies"--
Coulson and Richardson's Chemical Engineering: Volume 3A: Chemical and Biochemical Reactors and Reaction Engineering, Fourth Edition, covers reactor design, flow modelling, gas-liquid and gas-solid reactions and reactors. Captures content converted from textbooks into fully revised reference material Includes content ranging from foundational through technical Features emerging applications, numerical methods and computational tools

Batch and Semi-batch Reactors: Practical Guides in Chemical Engineering is a cluster of short texts that provide a focused introductory view on a single subject. The full library presents a basic understanding of the main topics in the chemical process industries, allowing engineering professionals to quickly access information. Each 'pocket publication' can be easily carried or accessed electronically, giving users a highly practical and applied presentation of the first principles engineers need know on a moment's notice. The focused facts provided in each guide help users converse with experts in the field, attempt their own initial troubleshooting, check calculations, and solve rudimentary problems. Practical, short, concise information on the basics in a variety of topics related to chemical engineering Supported by industry examples to help readers solve real-world problems Single subject volumes provide key facts for professionals Pocket publication format can be easily carried or accessed electronically

Clear evidence of increasing demands in the processing industry prompted the editors and authors to publish a new book about High Pressure Process Technology: Fundamentals and Applications. This book presents the latest knowledge regarding the high pressure processing aspects combined with that about the modeling, the design and the operation of safe and reliable high pressure plants and equipment. This treatment and selection of the subjects is stimulating and unique. Consisting of nine chapters, each subdivided into several sections, the book addresses the high pressure aspects, providing well selected correlated information connected with a comprehensive overview together with a large number of references. The main body of the first eight chapters refers to subjects like high pressure in general, the thermodynamics and kinetics of the fluids involved, the design of high pressure equipment, the modeling and design of reactors, separation and fractionation units, the safety aspects, the control and economics. In the extended last chapter, examples of promising high pressure applications are explained, such as chemical and enzymatic reactions in supercritical solvents, hydrogenation under supercritical conditions, supercritical water oxidation, polymerization with metallocene catalysts, supercritical extraction, fractionation and precipitation, supercritical pharma processing, ultra-high pressure sterilization and supercritical dry-cleaning.

This book closes the gap between Chemical Reaction Engineering and Fluid Mechanics. It provides the basic theory for momentum, heat and mass transfer in reactive systems. Numerical methods for solving the resulting equations as well as the interplay between physical and numerical modes are discussed. The book

is written using the standard terminology of this community. It is intended for researchers and engineers who want to develop their own codes, or who are interested in a deeper insight into commercial CFD codes in order to derive consistent extensions and to overcome "black box" practice. It can also serve as a textbook and reference book.

Based on a former popular course of the same title, *Concepts of Chemical Engineering for Chemists* outlines the basic aspects of chemical engineering for chemistry professionals. It clarifies the terminology used and explains the systems methodology approach to process design and operation for chemists with limited chemical engineering knowledge. The book provides practical insights into all areas of chemical engineering with well explained worked examples and case studies. The new edition contains a revised chapter on Process Analysis and two new chapters "Process and Personal Safety" and "Systems Integration and Experimental Design", the latter drawing together material covered in the previous chapters so that readers can design and test their own pilot process systems. This book is a guide for chemists (and other scientists) who either work alongside chemical engineers or who are undertaking chemical engineering-type projects and who wish to communicate with their colleagues and understand chemical engineering principles.

Adsorption, Ion Exchange and Catalysis is essentially a mixture of environmental science and chemical reactor engineering. More specifically, three important heterogeneous processes, namely, adsorption, ion exchange and catalysis, are analysed, from fundamental kinetics to reactor design with emphasis on their environmental applications. In Chapter 1, the subject of air and water pollution is dealt with. Data about pollutants and emission sources are given and the treatment methods are shortly presented. In Chapter 2, the very basics and historical development of adsorption, ion exchange and catalysis are presented as well as their environmental applications. Chapter 3 is devoted to heterogeneous processes and reactor analysis. All types of reactors are described in depth and reactor modelling, hydraulics and mass/heat transfer phenomena are examined for each type of reactor. Chapters 4 and 5 are dedicated to adsorption & ion exchange and catalysis, respectively. The basic principles are presented including kinetics, equilibrium, mass/heat transfer phenomena as well as the analytical solutions of the reactor models presented in Chapter 3. In the sixth chapter, the subject of scale up is approached. The two Annexes at the end of the book contain physical properties of substances of environmental interest as well as unit conversion tables. Finally, nearly all the examples contained are based on real experimental data found in literature with environmental interest. Most of the examples consider all aspects of operation design – kinetics, hydraulics and mass transfer. * Provides basic knowledge of major environmental problems and connects them to chemical engineering

The role of the chemical reactor is crucial for the industrial conversion of raw materials into products and numerous factors must be considered when selecting an appropriate and efficient chemical reactor. *Chemical Reaction Engineering and Reactor Technology* defines the qualitative aspects that affect the selection of an industrial chemical reactor and couples various reactor models to case-specific kinetic expressions for chemical processes. Offering a systematic development of the chemical reaction engineering concept, this volume explores: Essential stoichiometric, kinetic, and thermodynamic terms needed in the analysis of chemical reactors Homogeneous and heterogeneous reactors Residence time distributions and non-ideal flow conditions in industrial reactors Solutions of algebraic and ordinary differential

equation systems Gas- and liquid-phase diffusion coefficients and gas-film coefficients
Correlations for gas-liquid systems Solubilities of gases in liquids Guidelines for laboratory reactors and the estimation of kinetic parameters The authors pay special attention to the exact formulations and derivations of mass energy balances and their numerical solutions. Richly illustrated and containing exercises and solutions covering a number of processes, from oil refining to the development of specialty and fine chemicals, the text provides a clear understanding of chemical reactor analysis and design.

Presents comprehensive coverage of the subject of thermodynamics from a chemical engineering viewpoint. This text provides an exposition of the principles of thermodynamics and details their application to chemical processes. It contains problems, examples, and illustrations to help students understand complex concepts.

The development and implementation of a new chemical process involves much more than chemistry, materials, and equipment. It is a very complex endeavor and its success depends on the effective interactions and organization of professionals in many different positions - scientists, chemical engineers, managers, attorneys, economists, and specialists. *Developing An Industrial Chemical Process: An Integrated Approach* is the first professional reference to examine the actual process development practices of industrial corporations, research organizations, engineering companies and universities. Backed by 45 years of experience within R&D, design, and management positions in various countries, the author presents his know-how for better and faster results and fewer start-up problems. While most books on chemical processes concentrate only on the scientific/technical aspect, this book also deals with the range of people and "real life" issues involved. *Developing An Industrial Chemical Process* serves as a "how to" guide for the effective management of process development procedures. The issues start with the "why" and "how" concerns of the executives and project managers and proceed with the actual implementation by professionals, each in his/her particular role. The author addresses the working organization and the different activities involved in a process development program, including the implementation, design, construction and start-up of a new plant. Finally, each chapter provides a short summary of the key issues along with suggestions for further reading. This book can help you handle the problems normally associated with the development and implementation of a new process and reduce the time and resources that you and your organization spend on this critical activity.

Chemical Engineering and Chemical Process Technology is a theme component of *Encyclopedia of Chemical Sciences, Engineering and Technology Resources* in the global *Encyclopedia of Life Support Systems (EOLSS)*, which is an integrated compendium of twenty Encyclopedias. Chemical engineering is a branch of engineering, dealing with processes in which materials undergo changes in their physical or chemical state. These changes may concern size, energy content, composition and/or other application properties. Chemical engineering deals with many processes belonging to chemical industry or related industries (petrochemical, metallurgical, food, pharmaceutical, fine chemicals, coatings and colors, renewable raw materials, biotechnological, etc.), and finds application in manufacturing of such products as acids, alkalis, salts, fuels, fertilizers, crop protection agents, ceramics, glass, paper, colors, dyestuffs, plastics, cosmetics, vitamins and many others. It also plays significant role in environmental protection, biotechnology, nanotechnology, energy production and sustainable economical development. The Theme on *Chemical Engineering and Chemical Process Technology* deals, in five volumes and covers several topics such as: *Fundamentals of Chemical Engineering*; *Unit Operations – Fluids*; *Unit Operations – Solids*; *Chemical Reaction Engineering*; *Process Development, Modeling, Optimization and Control*; *Process Management*; *The Future of Chemical Engineering*; *Chemical Engineering Education*; *Main Products*, which are then expanded into multiple subtopics, each as a chapter. These five volumes are aimed at the following five major target audiences: University and College

students Educators, Professional practitioners, Research personnel and Policy analysts, managers, and decision makers and NGOs.

Describes how to conduct kinetic experiments with heterogeneous catalysts, analyze and model the results, and characterize the catalysts Detailed analysis of mass transfer in liquid phase reactions involving porous catalysts. Important to the fine chemicals and pharmaceutical industries so it has appeal to many researchers in both industry and academia (chemical engineering and chemistry departments

Laurence Belfiore's unique treatment meshes two mainstream subject areas in chemical engineering: transport phenomena and chemical reactor design. Expressly intended as an extension of Bird, Stewart, and Lightfoot's classic Transport Phenomena, and Froment and Bischoff's Chemical Reactor Analysis and Design, Second Edition, Belfiore's unprecedented text explores the synthesis of these two disciplines in a manner the upper undergraduate or graduate reader can readily grasp. Transport Phenomena for Chemical Reactor Design approaches the design of chemical reactors from microscopic heat and mass transfer principles. It includes simultaneous consideration of kinetics and heat transfer, both critical to the performance of real chemical reactors. Complementary topics in transport phenomena and thermodynamics that provide support for chemical reactor analysis are covered, including: Fluid dynamics in the creeping and potential flow regimes around solid spheres and gas bubbles The corresponding mass transfer problems that employ velocity profiles, derived in the book's fluid dynamics chapter, to calculate interphase heat and mass transfer coefficients Heat capacities of ideal gases via statistical thermodynamics to calculate Prandtl numbers Thermodynamic stability criteria for homogeneous mixtures that reveal that binary molecular diffusion coefficients must be positive In addition to its comprehensive treatment, the text also contains 484 problems and ninety-six detailed solutions to assist in the exploration of the subject. Graduate and advanced undergraduate chemical engineering students, professors, and researchers will appreciate the vision, innovation, and practical application of Laurence Belfiore's Transport Phenomena for Chemical Reactor Design.

Introduction to Chemical Reactor Analysis, Second Edition introduces the basic concepts of chemical reactor analysis and design, an important foundation for understanding chemical reactors, which play a central role in most industrial chemical plants. The scope of the second edition has been significantly enhanced and the content reorganized for improved pedagogical value, containing sufficient material to be used as a text for an undergraduate level two-term course. This edition also contains five new chapters on catalytic reaction engineering. Written so that newcomers to the field can easily progress through the topics, this text provides sufficient knowledge for readers to perform most of the common reaction engineering calculations required for a typical practicing engineer. The authors introduce kinetics, reactor types, and commonly used terms in the first chapter. Subsequent chapters cover a review of chemical engineering thermodynamics, mole balances in ideal reactors for three common reactor types, energy balances in ideal reactors, and chemical reaction kinetics. The text also presents an introduction to nonideal reactors, and explores kinetics and reactors in catalytic systems. The book assumes that readers have some knowledge of thermodynamics, numerical methods, heat transfer, and fluid flow. The authors include an appendix for numerical methods, which are essential to solving most realistic problems in chemical reaction engineering. They also provide numerous worked examples and additional problems in each chapter. Given the significant number of chemical engineers involved in chemical process plant operation at some point in their careers, this book offers essential training for interpreting chemical reactor performance and improving reactor operation. What's New in This Edition: Five new chapters on catalytic reaction engineering, including various catalytic reactions and kinetics, transport processes, and experimental methods Expanded coverage of adsorption Additional worked problems Reorganized material

Provides a holistic approach to multiphase catalytic reactors from their modeling and design to their applications in industrial manufacturing of chemicals. Covers theoretical aspects and examples of fixed-bed, fluidized-bed, trickle-bed, slurry, monolith and microchannel reactors. Includes chapters covering experimental techniques and practical guidelines for lab-scale testing of multiphase reactors. Includes mathematical content focused on design equations and empirical relationships characterizing different multiphase reactor types together with an assortment of computational tools. Involves detailed coverage of multiphase reactor applications such as Fischer-Tropsch synthesis, fuel processing for fuel cells, hydrotreating of oil fractions and biofuels processing.

Catalytic oxidation processes are of central importance to a substantial part of large-scale chemical industry. Indeed, this area of industrial catalysis has an extremely long history which stretches back well into the last century. The development and growth of catalytic oxidation processes for the manufacture of commodities such as sulfuric acid and nitric acid can be viewed as indicators for the growth of the early and middle years of the entire inorganic chemical industry, and in an analogous fashion the manufacture of products such as phthalic anhydride, maleic anhydride and ethylene oxide has been central to the development of an organic chemical industry. We should all be able to learn from history, and present-day scientists and technologists will find considerable benefit in following the account of the historical development of catalytic oxidation processes presented in Chapter I by Drs. G. Chinchin, P. Davies and R. J. Sampson. Alkenes are important intermediates in many processes in organic chemical industry. Being mostly petroleum derived, the alkene availability pattern does not necessarily match consumption requirements and an alkene interconversion process such as metathesis is clearly of industrial importance. In fact alkene metathesis, in addition to its industrial significance, poses an interesting mechanistic problem, upon which considerable effort has been expended in recent years and which is now fairly well understood.

Gas Separation by Adsorption Processes provides a thorough discussion of the advancement in gas adsorption process. The book is comprised of eight chapters that emphasize the fundamentals concept and principles. The text first covers the adsorbents and adsorption isotherms, and then proceeds to detailing the equilibrium adsorption of gas mixtures. Next, the book covers rate processes in adsorbents and adsorbent dynamics. The next chapter discusses cyclic gas separation processes, and the remaining two chapters cover pressure-swing adsorption. The book will be of great use to students, researchers, and practitioners of disciplines that involve gas separation processes, such as chemical engineering.

The current, thoroughly revised and updated edition of this approved title, evaluates information sources in the field of technology. It provides the reader not only with information of primary and secondary sources, but also analyses the details of information from all the important technical fields, including environmental technology, biotechnology, aviation and defence, nanotechnology, industrial design, material science, security and health care in the workplace, as well as aspects of the fields of chemistry, electro technology and mechanical engineering. The sources of information presented also contain publications available in printed and electronic form, such as books, journals, electronic magazines, technical reports, dissertations, scientific reports,

articles from conferences, meetings and symposiums, patents and patent information, technical standards, products, electronic full text services, abstract and indexing services, bibliographies, reviews, internet sources, reference works and publications of professional associations. Information Sources in Engineering is aimed at librarians and information scientists in technical fields as well as non-professional information specialists, who have to provide information about technical issues. Furthermore, this title is of great value to students and people with technical professions.

Introduction to Process Engineering and Design covers basic principles to design alternate systems, develop process diagrams and select the best alternative to be adopted. Multiple industrial examples provided in the book will enhance the skills of the readers for innovative designs. Salient Features: • Focuses on process design of chemical plants and equipment • State-of-the-art technique of supercritical extraction, reactive distillation, short path distillation discussed • Process Flow-charts are provided throughout the book

Chemical Engineering Design: Principles, Practice and Economics of Plant and Process Design is one of the best-known and most widely adopted texts available for students of chemical engineering. The text deals with the application of chemical engineering principles to the design of chemical processes and equipment. The third edition retains its hallmark features of scope, clarity and practical emphasis, while providing the latest US codes and standards, including API, ASME and ISA design codes and ANSI standards, as well as coverage of the latest aspects of process design, operations, safety, loss prevention, equipment selection, and more. The text is designed for chemical and biochemical engineering students (senior undergraduate year, plus appropriate for capstone design courses where taken), and professionals in industry (chemical process, biochemical, pharmaceutical, petrochemical sectors). Provides students with a text of unmatched relevance for chemical process and plant design courses and for the final year capstone design course Written by practicing design engineers with extensive undergraduate teaching experience Contains more than 100 typical industrial design projects drawn from a diverse range of process industries NEW TO THIS EDITION Includes new content covering food, pharmaceutical and biological processes and commonly used unit operations Provides updates on plant and equipment costs, regulations and technical standards Includes limited online access for students to Cost Engineering's Cleopatra Enterprise cost estimating software

Chemical Reaction Engineering: Essentials, Exercises and Examples presents the essentials of kinetics, reactor design and chemical reaction engineering for undergraduate students. Concise and didactic in its approach, it features over 70 resolved examples and many exercises. The work is organized in two parts: in the first part kinetics is presented

The fourth edition of Ludwig's Applied Process Design for Chemical and Petrochemical Plants, Volume Three is a core reference for chemical, plant, and process engineers and provides an unrivalled reference on methods, process fundamentals, and supporting design data. New to this edition are expanded chapters on heat transfer plus additional chapters focused on the design of shell and tube heat exchangers, double pipe heat exchangers and air coolers. Heat tracer requirements for pipelines and heat loss from insulated pipelines are covered in this new edition, along with batch heating

and cooling of process fluids, process integration, and industrial reactors. The book also looks at the troubleshooting of process equipment and corrosion and metallurgy. Assists engineers in rapidly analyzing problems and finding effective design methods and mechanical specifications Definitive guide to the selection and design of various equipment types, including heat exchanger sizing and compressor sizing, with established design codes Batch heating and cooling of process fluids supported by Excel programs

Chemical Engineering Kinetics McGraw-Hill (canada) Chemical Engineering Kinetics Chemical Reaction Engineering and Reactor Technology CRC Press Chemical reaction engineering is concerned with the exploitation of chemical reactions on a commercial scale. It's goal is the successful design and operation of chemical reactors. This text emphasizes qualitative arguments, simple design methods, graphical procedures, and frequent comparison of capabilities of the major reactor types. Simple ideas are treated first, and are then extended to the more complex.

Over the last three decades the process industries have grown very rapidly, with corresponding increases in the quantities of hazardous materials in process, storage or transport. Plants have become larger and are often situated in or close to densely populated areas. Increased hazard of loss of life or property is continually highlighted with incidents such as Flixborough, Bhopal, Chernobyl, Three Mile Island, the Phillips 66 incident, and Piper Alpha to name but a few. The field of Loss Prevention is, and continues to, be of supreme importance to countless companies, municipalities and governments around the world, because of the trend for processing plants to become larger and often be situated in or close to densely populated areas, thus increasing the hazard of loss of life or property. This book is a detailed guidebook to defending against these, and many other, hazards. It could without exaggeration be referred to as the "bible" for the process industries. This is THE standard reference work for chemical and process engineering safety professionals. For years, it has been the most complete collection of information on the theory, practice, design elements, equipment, regulations and laws covering the field of process safety. An entire library of alternative books (and cross-referencing systems) would be needed to replace or improve upon it, but everything of importance to safety professionals, engineers and managers can be found in this all-encompassing reference instead. Frank Lees' world renowned work has been fully revised and expanded by a team of leading chemical and process engineers working under the guidance of one of the world's chief experts in this field. Sam Mannan is professor of chemical engineering at Texas A&M University, and heads the Mary Kay O'Connor Process Safety Center at Texas A&M. He received his MS and Ph.D. in chemical engineering from the University of Oklahoma, and joined the chemical engineering department at Texas A&M University as a professor in 1997. He has over 20 years of experience as an engineer, working both in industry and academia. New detail is added to chapters on fire safety,

engineering, explosion hazards, analysis and suppression, and new appendices feature more recent disasters. The many thousands of references have been updated along with standards and codes of practice issued by authorities in the US, UK/Europe and internationally. In addition to all this, more regulatory relevance and case studies have been included in this edition. Written in a clear and concise style, Loss Prevention in the Process Industries covers traditional areas of personal safety as well as the more technological aspects and thus provides balanced and in-depth coverage of the whole field of safety and loss prevention. * A must-have standard reference for chemical and process engineering safety professionals * The most complete collection of information on the theory, practice, design elements, equipment and laws that pertain to process safety * Only single work to provide everything; principles, practice, codes, standards, data and references needed by those practicing in the field "Interesting with many useful ideas and references. It covers a broad range and it is a good introduction to this field." ---Analyst

The publication of the third edition of 'Chemical Engineering Volume 3' marks the completion of the re-orientation of the basic material contained in the first three volumes of the series. Volume 3 is devoted to reaction engineering (both chemical and biochemical), together with measurement and process control. This text is designed for students, graduate and postgraduate, of chemical engineering.

This book of chemical & Petroleum Engineering Contains of Various Topics. It covers different type of question with their Answers and Fill in the Blanks. Required data and equations are given for day to day calculations of Chemical Engineering topics. This book is necessary tool or an instrument for Chemical & Petroleum Engineers.

Chemical Reactor Development is written primarily for chemists and chemical engineers who are concerned with the development of a chemical synthesis from the laboratory bench scale, where the first successful experiments are performed, to the design desk, where the first commercial reactor is conceived. It is also written for those chemists and chemical engineers who are concerned with the further development of a chemical process with the objective of enhancing the performance of an existing industrial plant, as well as for students of chemistry and chemical engineering. In Part I, the 'how' and the 'why' of chemical reaction engineering are explained, particularly for those who are not familiar with this area. Part II deals with the effects of a number of physical phenomena on the outcome of chemical reactions, such as micro and meso-mixing and residence time distribution, mass transfer between two phases, and the formation of another phase, such as in precipitations. These scale-dependent effects are not only important in view of the conversion of chemical reactions, but also with regard to the selectivity, and in the case of solid products, to their morphology. In Part III, some applications are treated in a general way, including organic syntheses, the conversion and formation of inorganic solids, catalytic

processes and polymerizations. The last chapter gives a review of the importance of the selectivity for product quality and for the purity of waste streams. For research chemists and chemical engineers whose work involves chemical reaction engineering. The book is also suitable as a supplementary graduate text.

In a clear and concise manner, this book explains how to apply concepts in chemical reaction engineering and transport phenomena to the design of catalytic combustion systems. Although there are many textbooks on the subject of chemical reaction engineering, catalytic combustion is mentioned either only briefly or not at all. The authors have chosen three examples where catalytic combustion is utilized as a primary combustion process and natural gas is used as a fuel - stationary gas turbines, process fluid heaters, and radiant heaters; these cover much of the area where research is currently most active. In each of these there are clear environmental benefits to be gained illustrating catalytic combustion as a "cleaner primary combustion process". The dominant heat transfer processes in each of the applications are different, as are the support systems, flow geometrics and operating conditions.

This book determines adjustable parameters in mathematical models that describe steady state or dynamic systems, presenting the most important optimization methods used for parameter estimation. It focuses on the Gauss-Newton method and its modifications for systems and processes represented by algebraic or differential equation models.

This book is an exhaustive presentation of the applications of numerical methods in chemical engineering. Intended primarily as a textbook for B.E./B.Tech and M.Tech students of chemical engineering, the book will also be useful for research and development/process professionals in the fields of chemical, biochemical, mechanical and biomedical engineering. The book, now, in its second edition, comprises three parts. Part I on General Chemical Engineering is same as given in the first edition of the book. It explains solving linear and non-linear algebraic equations, chemical engineering thermodynamics problems, initial value problems, boundary value problems and topics related to chemical reaction, dispersion and diffusion as well as steady and transient heat conduction. Whereas, Part II and Part III comprising two chapters and six chapters, respectively, are newly introduced in the present edition. Besides, three appendices covering computer programs have been included. For practice, the book provides students with numerous worked-out examples and chapter-end exercises including their answers. NEW TO THE SECOND EDITION • Part II on Fixed Bed Catalytic Reactor consists of solving multiple gas phase reactions in a PFR, diffusion and multiple reactions in a catalytic pellet, and fixed bed catalytic reactor with multiple reactions. • Part III on Multicomponent Distillation consists of solving vapour-liquid-liquid isothermal flash using NRTL model, adiabatic flash using Wilson model, bubble point method, theta method and Naphtali-Sandholm method for distillation using modified Raoult's law with Wilson activity coefficient model.

The Second Edition features new problems that engage readers in contemporary reactor design Highly praised by instructors, students, and chemical engineers, Introduction to Chemical Engineering Kinetics & Reactor Design has been extensively

