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CHEMICAL PROCESS ENGINEERING

***Written by one of the most prolific and
respected chemical engineers in the world***

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and his co-author, also a well-known and respected engineer, this two-volume set is the “new standard” in the industry, offering engineers and students alike the most up-to-date, comprehensive, and state-of-the-art coverage of processes and best practices in the field today. This new two-volume set explores and describes

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integrating new tools for engineering education and practice for better utilization of the existing knowledge on process design. Useful not only for students, university professors, and practitioners, especially process, chemical, mechanical and metallurgical engineers, it is also a valuable reference for other

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engineers, consultants, technicians and scientists concerned about various aspects of industrial design. The text can be considered as complementary to process design for senior and graduate students as well as a hands-on reference work or refresher for engineers at entry level. The contents of the book can also be taught in

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intensive workshops in the oil, gas, petrochemical, biochemical and process industries. The book provides a detailed description and hands-on experience on process design in chemical engineering, and it is an integrated text that focuses on practical design with new tools, such as Microsoft Excel spreadsheets and UniSim

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simulation software. Written by two of the industry's most trustworthy and well-known authors, this book is the new standard in chemical, biochemical, pharmaceutical, petrochemical and petroleum refining. Covering design, analysis, simulation, integration, and, perhaps most importantly, the practical

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application of Microsoft Excel-UniSim software, this is the most comprehensive and up-to-date coverage of all of the latest developments in the industry. It is a must-have for any engineer or student's library.

Mathcad for Chemical Engineers demonstrates the use of Mathcad 13,

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which is the latest version of one of the most powerful and popular computational software packages in the world, for solving various chemical engineering problems. The book serves as a must-to-have guide and quick reference for chemical engineers and those who would like to learn and use Mathcad as their

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computational tool. This book can also be used as a textbook for chemical engineering education on computing using Mathcad. The book contains many real-life chemical engineering examples from various areas: material and energy balance, thermodynamics, transport phenomena, kinetics and reactor design,

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unit operations, engineering economics, and operations management. Unlike other books of similar theme, concise, but comprehensive, explanations are given in each chapter and step-by-step procedures of solving mathematical problems are also given for quick reference. Many examples allow readers to experience the

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power of Mathcad in solving chemical engineering problems. The book has chapters on Mathcad fundamentals, solving a single algebraic equation and a system of algebraic equations, curve fitting, integration and differentiation, solving a single ordinary differential equation (ODE) and a system of ODEs,

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solving a single partial differential equation (PDE) and a system of PDEs, and programming in Mathcad. There are a number of exercise problems at the end of each chapter that allow readers to further expose themselves to various chemical engineering problems. Although Mathcad 13 is the software package

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chosen by the authors and used throughout the book, most of the features discussed can also be applied using earlier versions of Mathcad. Furthermore, although Mathcad will always evolve into a newer version, most of the contents in this book will be applicable for any subsequent version of Mathcad.

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A Practical Approach to Chemical Engineering for Non-Chemical Engineers is aimed at people who are dealing with chemical engineers or those who are involved in chemical processing plants. The book demystifies complicated chemical engineering concepts through daily life examples and analogies. It

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contains many illustrations and tables that facilitate quick and in-depth understanding of the concepts handled in the book. By studying this book, practicing engineers (non-chemical), professionals, technicians and other skilled workers will gain a deeper understanding of what chemical engineers say and ask for. The

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book is also useful for engineering students who plan to get into chemical engineering and want to know more on the topic and any related jargon. Provides numerous graphs, images, sketches, tables, help better understanding of concepts in a visual way Describes complicated chemical engineering

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concepts by daily life examples and analogies, rather than by formula

Includes a virtual tour of an imaginary process plant Explains the majority of units in chemical engineering

Step-by-step instructions enable chemical engineers to masterkey software programs and solve complex problems Today, both

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students and professionals in chemical engineering must solve increasingly complex problems dealing with refineries, fuel cells, microreactors, and pharmaceutical plants, to name a few. With this book as their guide, readers learn to solve these problems using their computers and Excel, MATLAB, Aspen

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Plus, and COMSOL Multiphysics.

Moreover, they learn how to check their solutions and validate their results to make sure they have solved the problems correctly. Now in its Second Edition, Introduction to Chemical Engineering Computing is based on the author's firsthand teaching experience. As a result,

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the emphasis is on problemsolving. Simple introductions help readers become conversant with each program and then tackle a broad range of problems in chemical engineering, including:
Equations of state Chemical reaction equilibria Mass balances with recycle streams Thermodynamics and simulation

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of mass transfer equipment Process simulation Fluid flow in two and three dimensions All the chapters contain clear instructions, figures, and examples to guide readers through all the programs and types of chemical engineering problems. Problems at the end of each chapter, ranging from simple to difficult,

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allow readers to gradually build their skills, whether they solve the problems themselves or in teams. In addition, the book's accompanying website lists the core principles learned from each problem, both from a chemical engineering and a computational perspective. Covering a broad range of disciplines and problems

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within chemical engineering, Introduction to Chemical Engineering Computing is recommended for both undergraduate and graduate students as well as practicing engineers who want to know how to choose the right computer software program and tackle almost any chemical engineering problem.

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*Encyclopedia of Chemical Processing and
Design*

*Chemical and Energy Process
Engineering*

An Introduction

*Elementary Principles of Chemical
Processes*

A Step by Step Approach to the Modeling

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The aim of this text is to provide a comprehensive set of calculations relating to mass and energy balances for an entire process plant. An ammonia synthesis plant will be taken as a calculation model

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to develop the relevant mass and energy balances necessary for the design and subsequent production, as the production of ammonia synthesis gas is an internationally used process. Instead of teaching the basics of mass and energy

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balances, the text aims to give a detailed series of process integrated and illustrated calculations to help readers develop and design a process plant. □ Details complete mass and energy calculations related to a

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manufacturing plant and includes stepwise procedures for mass and energy balances □ Demonstrates how the series of integrated calculations will lead to the production of a specified amount of final product □ Features □teaching□

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appendices that lay out applications of prior-assumed knowledge, which can be used in conjunction with the main text where more detailed explanation may be needed □

Contains problems linked to various manufacturing sections covered in

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the text to help readers consolidate their knowledge This book will serve undergraduate Chemical Engineering students as a teaching aid in capstone design and related courses and gives useful insights to advanced students, researchers,

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and industry personnel within the Chemical Engineering field. Separation Process Essentials provides an interactive approach for students to learn the main separation processes (distillation, absorption, stripping, and solvent

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extraction) using material and energy balances with equilibrium relationships, while referring readers to other more complete works when needed. Membrane separations are included as an example of non-equilibrium

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processes. This book reviews and builds on material learned in the first chemical engineering courses such as Material and Energy Balances and Thermodynamics as applied to separations. It relies heavily on example problems,

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including completely worked and explained problems followed by "Try This At Home" guided examples. Most examples have accompanying downloadable Excel spreadsheet simulations. The book also offers a complementary

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website,

<http://separationsbook.com>, with supplementary material such as links to YouTube tutorials, practice problems, and the Excel simulations. This book is aimed at second and third year

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undergraduate students in Chemical engineering, as well as professionals in the field of Chemical engineering, and can be used for a one semester course in separation processes and unit operations.

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Chemical engineering applications have been a source of challenging optimization problems in terms of economics and technology. The goal of this book is to enable the reader to get instant information on fundamentals and advancements in

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chemical engineering. This book addresses ongoing evolutions of chemical engineering and provides overview to the state of the art advancements. Molecular perspective is increasingly important in the refinement of

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kinetic and thermodynamic molding. As a result, much of the material was revised on industrial problems and their sophisticated solutions from known scientists around the world. These issues were divided in to two sections,

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fundamental advances and catalysis and reaction engineering. A distinct feature of this text continues to be the emphasis on molecular chemistry, reaction engineering and modeling to achieve rational and robust

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industrial design. Our perspective is that this background must be made available to undergraduate, graduate and professionals in an integrated manner.

This book treats modeling and simulation in a simple way, that

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builds on the existing knowledge and intuition of students. They will learn how to build a model and solve it using Excel. Most chemical engineering students feel a shiver down the spine when they see a set of complex mathematical equations

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generated from the modeling of a chemical engineering system. This is because they usually do not understand how to achieve this mathematical model, or they do not know how to solve the equations system without spending a lot of

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time and effort. Trying to understand how to generate a set of mathematical equations to represent a physical system (to model) and solve these equations (to simulate) is not a simple task. A model, most of the time, takes into

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account all phenomena studied during a Chemical Engineering course. In the same way, there is a multitude of numerical methods that can be used to solve the same set of equations generated from the modeling, and many different

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computational languages can be adopted to implement the numerical methods. As a consequence of this comprehensiveness and combinatorial explosion of possibilities, most books that deal with this subject are very extensive

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and embracing, making need for a lot of time and effort to go through this subject. It is expected that with this book the chemical engineering student and the future chemical engineer feel motivated to solve different practical problems

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involving chemical processes, knowing they can do that in an easy and fast way, with no need of expensive software.

A Practical Approach to Chemical Engineering for Non-Chemical Engineers

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Chemical Engineering Design
Mathcad for Chemical Engineers
Handbook on Material and Energy
Balance Calculations in
Metallurgical Processes
SI edition
Lately, there has been a

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renewed push to minimize the waste of materials and energy that accompany the production and processing of various materials. This third edition of this reference emphasizes the

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fundamental principles of the conservation of mass and energy, and their consequences as they relate to materials and energy. New to this edition are numerous

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worked examples,
illustrating conventional
and novel problem-solving
techniques in applications
such as semiconductor
processing, environmental
engineering, the

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production and processing of advanced and exotic materials for aerospace, electronic, and structural applications.

Students taking their first chemical engineering

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course plunge into the 'nuts and bolts' of mass and energy balances and often miss the broad view of what chemical engineers do. This 1998 text offers a well-paced introduction

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to chemical engineering.

Students are first introduced to the fundamental steps in design and three methods of analysis: mathematical modeling, graphical

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methods, and dimensional analysis. The book then describes how to apply engineering skills, such as how to simplify calculations through assumptions and

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approximations; how to verify calculations, significant figures, spreadsheets, graphing (standard, semi-log and log-log); and how to use data maps. In addition,

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the book teaches engineering skills through the design and analysis of chemical processes and process units in order to assess product quality, economics, safety, and

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environmental impact. This text will help undergraduate students in chemical engineering develop engineering skills early in their studies. Lecturer's solution manual

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available from the

publisher on request.

Material and energy (M&E) balances are fundamental to chemical (process) engineering, environmental engineering and industrial

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chemistry. This text presents M&E balance calculations in a compact, transparent format accessible to students and professionals in the above fields, and to others who

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want to quantify the physical progress of our civilization. The text embraces all topics covered in corresponding engineering undergraduate courses and deals with

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environmental and sustainability issues of current concern to society. The general balance equation is the foundation for a review of relevant science and

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economics, and hence, for material and energy accounting in batch and continuous chemical processes. The text focuses on SI units, using flowsheets and stream

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tables in computer spreadsheets to represent practical systems. Worked examples range from simple stoichiometry to modeling multi-unit recycle and unsteady-state processes.

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Industrial food processing involves the production of added value foods on a large scale; these foods are made by mixing and processing different ingredients in a

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prescribed way. The food industry, historically, has not designed its processes in an engineering sense, i.e. by understanding the physical and chemical principles

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which govern the operation of the plant and then using those principles to develop a process. Rather, processes have been 'designed' by purchasing equipment from a range of

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suppliers and then connecting that equipment together to form a complete process. When the process being run has essentially been scaled up from the kitchen then this

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may not matter. However, there are limits to the approach. • As the industry becomes more sophisticated, and economies of scale are exploited, then the size

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of plant reaches a scale where systematic design techniques are needed. • The range of processes and products made by the food industry has increased to include foods which have

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no kitchen counterpart, such as low-fat spreads. • It is vital to ensure the quality and safety of the product. • Plant must be flexible and able to cope with the need to make a

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variety of products from a range of ingredients. This is especially important as markets evolve with time.

- The traditional design process cannot readily handle multi-product and

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multi-stream operations. •
Processes must be energetically efficient and meet modern environmental standards.
Design, Analysis,
Simulation, Integration,

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and Problem Solving with
Microsoft Excel-UniSim
Software for Chemical
Engineers Computation,
Physical Property, Fluid
Flow, Equipment and
Instrument Sizing

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Chemical Engineering for
the Food Industry
Handbook on Material and
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Models and an Introduction to
Biological Systems Introductory
Chemical Engineering
Thermodynamics, Second
Edition, helps readers master the
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thermodynamics as practiced today: with extensive development of molecular perspectives that enables adaptation to fields including biological systems, environmental applications, and

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nanotechnology. This text is distinctive in making molecular perspectives accessible at the introductory level and connecting properties with practical implications. Features of the second edition include

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systems like distillation columns, reactive processes, and biological systems Learning objectives, problem-solving strategies for energy balances and phase equilibria, chapter summaries, and “important

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equations” for every chapter
Extensive practical examples,
especially coverage of non-ideal
mixtures, which include water
contamination via hydrocarbons,
polymer blending/recycling,
oxygenated fuels, hydrogen

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bonding, osmotic pressure,
electrolyte solutions, zwitterions
and biological molecules, and
other contemporary issues
Supporting software in formats
for both MATLAB® and
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supplemental sections and resources including instructor slides, ConcepTests, coursecast videos, and other useful resources

Second International Conference
on Chemical Engineering

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Education presents the situation in chemical engineering education in Germany, Hungary, Spain, Japan, and in the United States. This book depicts an awareness of the problems of professional education together

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with a wide spectrum of opinions on their solution. Organized into 39 chapters, this book begins with an overview of the actual situation of chemical engineering education program in Spain. This text then examines the detailed

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formalities of chemical engineering in secondary schools. Other chapters consider the change in chemical engineering education in Japan due to the change of chemical industries as well as by a great

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change of students' attitude. This book discusses as well the curriculum proposal for the education of undergraduate and graduate levels as well as foreign students' education. The final chapter reviews the

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European situation of chemical engineering education system. This book is a valuable resource for teachers and students of chemical engineering. This best selling text prepares students to formulate and solve

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material and energy balances in chemical process systems and lays the foundation for subsequent courses in chemical engineering. The text provides a realistic, informative, and positive introduction to the practice of

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chemical engineering. The Integrated Media Edition update provides a stronger link between the text, media supplements, and new student workbook.

Very Good, No Highlights or Markup, all pages are intact.

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Chemical Process Engineering
Volume 1
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For Engineers And
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CEE. Chemical Engineering
Education

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Pinch Analysis for Energy and
Carbon Footprint Reduction
User Guide to Process
Integration for the Efficient Use
of Energy

Emphasizing basic mass and
energy balance principles,

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Chemical and Energy Process Engineering prepares the next generation of process engineers through an exemplary survey of energy process engineering, basic thermodynamics, and the analysis of energy

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efficiency. By emphasizing the laws of thermodynamics and the law of mass/matter conservation, the author builds a strong foundation for performing industrial process engineering calculations. The book's

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systematic treatment applies these core principles on a macro-level scale, allowing for more manageable calculations. The development of new processes is demanding and exciting. The instruction within these

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pages enables engineers to understand and analyze existing processes and primes them for participation in the development of new ones. This text provides an introduction to

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supercritical fluids with
easy-to-use Excel
spreadsheets suitable for
both specialized-discipline
(chemistry or chemical
engineering student) and
mixed-discipline
(engineering/economic

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student) classes. Each chapter contains worked examples, tip boxes and end-of-the-chapter problems and projects. Part I covers web-based chemical information resources, applications and simplified theory presented

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in a way that allows students of all disciplines to delve into the properties of supercritical fluids and to design energy, extraction and materials formation systems for real-world processes that use

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supercritical water or
supercritical carbon
dioxide. Part II takes a
practical approach and
addresses the thermodynamic
framework, equations of
state, fluid phase
equilibria, heat and mass

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transfer, chemical equilibria and reaction kinetics of supercritical fluids. Spreadsheets are arranged as Visual Basic for Applications (VBA) functions and macros that are completely (source code)

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accessible for students who have interest in developing their own programs.

Programming is not required to solve problems or to complete projects in the text. Property worksheets/spreadsheets that

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are easy to use in learning environments Worked examples with Excel VBA Worksheet functions allow users to design their own processes Fluid phase equilibria and chemical equilibria worksheets allow users to

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change conditions, study new solutes, co-solvents, chemical systems or reactions

Energy costs impact the profitability of virtually all industrial processes. Stressing how plants use

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power, and how that power is actually generated, this book provides a clear and simple way to understand the energy usage in various processes, as well as methods for optimizing these processes using practical

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hands-on simulations and a unique approach that details solved problems utilizing actual plant data.

Invaluable information offers a complete energy-saving approach essential for both the chemical and

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mechanical engineering curricula, as well as for practicing engineers.

"This book approaches the subject of material and energy balances from two directions. First, it emphasizes the fundamental

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principles of the conservation of mass and energy, and the consequences of these two principles. Second it applies the techniques of computational chemistry to materials processing, and introduces

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new software developed by the author especially for material and heat balances. The third edition reflects the changes in the professional engineer's practice in the last 30 years, reflecting the

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dramatic shift away from metallurgical engineering and the extractive industry towards materials engineering. A large and growing number of recent graduates are employed in such fields as semiconductor

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processing, environmental engineering, and the production and processing of advanced and exotic materials for aerospace, electronic and structural applications. The advance in computing power and software

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for the desktop computer has significantly changed the way engineers make computations, and the biggest change comes from the computational approach used to solve problems. The spreadsheet program Excel is

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used extensively throughout the text as the main computational "engine" for solving material and energy balance equations, and for statistical analysis of data. The use of Excel and the introduction of the add-

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in programs enables the study of a range of variables on critical process parameters, and emphasis is placed on multi-device flowsheets with recycle, bypass, and purge streams whose material and

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heat balance equations were previously too complicated to solve by the normally-used hand calculator. The Excel-based program FlowBal helps the user set up material and heat balance equations for processes with

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multiple streams and
units"--

Fundamentals of Chemical
Engineering Thermodynamics
With Applications to
Chemical Processes
Separation Process
Essentials

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Chemical Engineering Design
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Computers in Chemical
Engineering Education

***New edition of a classic textbook
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*contains a PC disk with 10 Fortran
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detailed case study - the production*

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of phthalic anhydride - with practical advice and comprehensive background information. Guiding the reader through all major aspects of a chemical engineering design, the text includes both the initial technical and economic

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feasibility study as well as the detailed design stages. Each aspect of the design is illustrated with material from an award-winning student design project. The book embodies the "learning by doing" approach to design. The student is

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directed to appropriate information sources and is encouraged to make decisions at each stage of the design process rather than simply following a design method.

Thoroughly revised, updated, and expanded, the accompanying text

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includes developments in important areas and many new references.

Elementary Principles of Chemical Processes, 4th Edition prepares students to formulate and solve material and energy balances in chemical process systems and lays

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the foundation for subsequent courses in chemical engineering.

The text provides a realistic, informative, and positive introduction to the practice of chemical engineering.

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most current, accurate, and practical fluid mechanics related applications that the practicing BS level engineer needs today in the chemical and related industries, in addition to a fundamental understanding of these applications

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*based upon sound fundamental
basic scientific principles. The
emphasis remains on problem
solving, and the new edition
includes many more examples.
Chemical Engineering Design and
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***Chemical Engineering Education
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Japan, and Held at Rob
A Spreadsheet-based Approach*

Material and energy balances

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are fundamental to many engineering disciplines and have a major role in decisions related to sustainable development. This text, which covers the substance of corresponding undergraduate courses, presents the balance

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concepts and calculations in a format accessible to students, engineering professionals and others who are concerned with the material and energy future of our society. Following a review of the basic science and

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economics, the text focuses on material and energy accounting in batch and continuous operations, with emphasis on generic process units, flow sheets, stream tables and spreadsheet calculations. There

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is a unified approach to reactive and non-reactive energy balance calculations, plus chapters dedicated to the general balance equation and simultaneous material and energy balances. Seventy worked examples show

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the elements of process balances and connect them with the material and energy concerns of the 21st century. Chemical Engineering Design is one of the best-known and most widely adopted texts available for

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this position of strength the fifth edition covers the latest aspects of process design, operations, safety, loss prevention and equipment selection, and much more. Comprehensive in coverage, exhaustive in detail,

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with over 25 years of established market leadership to back it up; an essential resource for the compulsory design project all chemical engineering students take in their final year A complete and trusted teaching

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Institution of Chemical Engineers, guaranteeing wide exposure to the academic and professional market in chemical and process engineering.

ORGANIC REACTIONS Written by two of the most prolific and

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respected chemical engineers in the world, this groundbreaking two-volume set is the “ new standard ” in the industry, offering engineers and students alike the most up-to-date, comprehensive, and state-of-the-

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art coverage of processes and best practices in the field today. This first new volume in a two-volume set explores and describes integrating new tools for engineering education and practice for better utilization of

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the existing knowledge on process design. Useful not only for students, professors, scientists and practitioners, especially process, chemical, mechanical and metallurgical engineers, it is also a valuable

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reference for other engineers, consultants, technicians and scientists concerned about various aspects of industrial design. The text can be considered as a complementary text to process design for senior

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and graduate students as well as a hands-on reference work or refresher for engineers at entry level. The contents of the book can also be taught in intensive workshops in the oil, gas, petrochemical, biochemical and

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process industries. The book provides a detailed description and hands-on experience on process design in chemical engineering, and it is an integrated text that focuses on practical design with new tools,

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such as Excel spreadsheets and UniSim simulation software.

Written by two industry and university 's most trustworthy and well-known authors, this book is the new standard in chemical, biochemical, pharmaceutical,

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petrochemical and petroleum refining. Covering design, analysis, simulation, integration, and, perhaps most importantly, the practical application of Microsoft Excel-UniSim software, this is the most comprehensive

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and up-to-date coverage of all of the latest developments in the industry. It is a must-have for any engineer or student ' s library. This course aims to connect the principles, concepts, and laws/postulates of classical and

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statistical thermodynamics to applications that require quantitative knowledge of thermodynamic properties from a macroscopic to a molecular level. It covers their basic postulates of classical

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thermodynamics and their application to transient open and closed systems, criteria of stability and equilibria, as well as constitutive property models of pure materials and mixtures emphasizing molecular-level

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effects using the formalism of statistical mechanics. Phase and chemical equilibria of multicomponent systems are covered. Applications are emphasized through extensive problem work relating to practical

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