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Product and Process Design Principles Product and Process Design Principles Product and Process Design Principles Process Design Principles PRODUCT & PROCESS DESIGN PRINCIPLES: SYNTHESIS, ANALYSIS AND EVALUATION, 2ND ED (With CD) Chemical Engineering Design Chemical Product Design: Towards a Perspective through Case Studies Chemical Process Design and Integration Studyguide for Product and Process Design Principles Studyguide for Product and Process Design Principles Chemical Product Design Chemical Process Design and Simulation: Aspen Plus and Aspen Hysys Applications Separation Process Principles Conceptual Design of Chemical Processes The Official ACT Prep Guide 2019-2020, (Book + 5 Practice Tests + Bonus Online Content) Food Process Design Principles and Case Studies of Simultaneous Design Equilibrium-Stage Separation Operations in Chemical Engineering Engineering Economics and Economic Design for Process Engineers Sustainable Chemical Processes and Products Chemical Process Design Integrated Design and Simulation of Chemical Processes Computer Methods in Chemical Engineering Separation Process Principles Ludwig's Applied Process Design for Chemical and Petrochemical Plants Handbook of Process Integration (PI) Chemical Reactor Analysis and Design Fundamentals Computational Fluid Dynamics: Principles and Applications MEMBRANE SEPARATION PROCESSES The Integration of Process Design and Control Product and Process Design Chemical Process Equipment - Selection and Design (Revised 2nd Edition) Practical Process Research & Development Process Intensification Process Intensification Albright's Chemical Engineering Handbook Unit Operations of Particulate Solids FLOWTRAN Simulation Elements of Chemical Reaction Engineering Writing Style and Standards in Undergraduate Reports

This practical how-to-do book deals with the design of sustainable chemical processes by means of systematic methods aided by computer simulation. Ample case studies illustrate generic creative issues, as well as the efficient use of simulation techniques, with each one standing for an important issue taken from practice. The didactic approach guides readers from basic knowledge to mastering complex flow-sheets, starting with chemistry and thermodynamics, via process synthesis, efficient use of energy and waste minimization, right up to plant-wide control and process dynamics. The simulation results are compared with flow-sheets and performance indices of actual industrial licensed processes, while the complete input data for all the case studies is also provided, allowing readers to reproduce the results with their own simulators. For everyone interested in the design of innovative chemical processes. Applied Algorithms + Software Packages = Advanced Tools for Solving Complex Problems The newest digital techniques, built on the sound foundations of the classic, best-

selling text. With a combination of user-friendly software and classic algorithms, students learn to solve problems through reasoning rather than memorization. Thorough coverage of the fundamentals of chemical reaction engineering forms the backbone of this trusted text, presented in a framework that helps develop critical-thinking skills and practical problem-solving. All the classical elements are covered. Elements of Chemical Reaction Engineering, Third Edition, builds a strong understanding of chemical reaction engineering principles and shows how they can be applied to numerous reactions in a variety of applications. The structured approach helps develop skills in critical thinking, creative thinking, and problem-solving, by employing open-ended questions and stressing the Socratic method. problems are included for each subject: *Straightforward problems that reinforce the material *Problems that encourage students to explore the issues and look for optimum solutions *Open-ended problems that encourage students to practice creative problem-solving skills Elements of Chemical Reaction Engineering, Third Edition remains a leader as the only undergraduate-level book to focus on computer-based solutions to chemical reaction problems. both students and instructors, including: *Learning Resources: lecture notes, web modules, and problem-solving heuristics *Living Example Problems: POLYMATH software that allows students to explore the examples and ask what-if questions *Professional Reference Shelf: detailed derivations, equations, general engineering materials, and specialty reactors and reaction systems *Additional Study Materials: extra homework problems, course syllabi, guides to popular software packages Throughout the text, margin icons link concepts and procedures to the material on the CD for fully integrated learning and reference. Web site: <http://www.engin.umich.edu/cr> A facility is only as efficient and profitable as the equipment that is in it: this highly influential book is a powerful resource for chemical, process, or plant engineers who need to select, design or configures plant successfully and profitably. It includes updated information on design methods for all standard equipment, with an emphasis on real-world process design and performance. The comprehensive and influential guide to the selection and design of a wide range of chemical process equipment, used by engineers globally • Copious examples of successful applications, with supporting schematics and data to illustrate the functioning and performance of equipment Revised edition, new material includes updated equipment cost data, liquid-solid and solid systems, and the latest information on membrane separation technology Provides equipment rating forms and manufacturers' data, worked examples, valuable shortcut methods, rules of thumb, and equipment rating forms to demonstrate and support the design process Heavily illustrated with many line drawings and schematics to aid understanding, graphs and tables to illustrate performance data This concise and systematically organized

text, now in its second edition, gives a clear insight into various membrane separation processes. It covers the fundamentals as well as the recent developments of different processes along with their industrial applications and the products. It includes the basic principles, operating parameters, membrane hardware, 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. 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. KEY FEATURES • Provides sufficient number 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. NEW TO THIS EDITION • A new section on membrane cleaning is included. Membrane fabrication methods are supplemented with additional information (Chapter 2). • Additional information on silt density index, forward osmosis and sea water desalination (Chapter 3). • Physicochemical parameters affecting nanofiltration, determination of various resistances using resistance in series model and few more industrial applications with additional short questions (Chapter 4). • Membrane cross-linking methods used in pervaporation, factors affecting pervaporation and few more applications (Chapter 9). • Membrane distillation, membrane reactor with different modules, types of membranes and reactions for membrane reactor (Chapter 13). Table of ContentsPart I: Product And Process Invention - Heuristics And AnalysisPart II: Detailed Process Synthesis - Algorithmic MethodsPart III: Detailed Design, Equipment Sizing,And Optimization - Configured Product DesignPart IV: Plantwide Controllability AssessmentPart V: Design Report Process Intensification is a comprehensive textbook and treats the theory of process intensification design, and all innovation steps from idea generation to commercial implementation, and all focused on contributing to the UN Sustainable Development Goals. This book covers the 'hard' elements of design, modelling, and experimental validations and the 'soft' elements, values of engineers, interests of stakeholders and beliefs of society. Never HIGHLIGHT a Book Again Includes all testable terms, concepts, persons, places, and events.

Cram101 Just the FACTS101 studyguides gives all of the outlines, highlights, and quizzes for your textbook with optional online comprehensive practice tests. Only Cram101 is Textbook Specific. Accompanies: 9780872893795. This item is printed on demand. Completely rewritten to enhance clarity, this third edition provides engineers with a strong understanding of the field. With the help of an additional co-author, the text presents new information on bioseparations throughout the chapters. A new chapter on mechanical separations covers settling, filtration, and centrifugation, including mechanical separations in biotechnology and cell lysis. Boxes help highlight fundamental equations. Numerous new examples and exercises are integrated throughout as well. In addition, frequent references are made to the software products and simulators that will help engineers find the solutions they need. This book provides a comprehensive, step-by-step approach to organic process research and development in the pharmaceutical, fine chemical, and agricultural chemical industries. Process R&D describes the steps taken, following synthesis and evaluation, to bring key compounds to market in a cost-effective manner. More people are being hired for work in this area as increasing numbers of drug candidates are identified through combinatorial chemistry and high-throughput screening. The book is directed to industrial (primarily organic) chemists, and academicians (particularly those involved in a growing number of start-up companies) and students who need insight into industrial process R&D. Current books do not describe hands-on, step-by-step, approaches to solving process development problems, including route, reagent, and solvent selection; optimising catalytic reactions; chiral syntheses; and "green chemistry." "Practical Process Research and Development" will be a valuable resource for researchers, managers, and graduate students. * Provides insights into generating rugged, practical, cost-effective processes for the chemical preparation of "small molecules" * Breaks down process optimization into route, reagent and solvent selection, development of reaction conditions, workup, crystallizations and more * Includes over 100 tips for rapid process development * Presents guidelines for implementing and troubleshooting processes Suitable for practicing engineers and engineers in training, this book covers the most important operations involving particulate solids. Through clear explanations of theoretical principles and practical laboratory exercises, the text provides an understanding of the behavior of powders and pulverized systems. It also helps readers develop skills for operating, optimizing, and innovating particle processing technologies and machinery in order to carry out industrial operations. The author explores common bulk solids processing operations, including milling, agglomeration, fluidization, mixing, and solid-fluid separation. Chemical Engineering Design, Second Edition, deals with the application of chemical engineering principles to the design of chemical processes and equipment. Revised throughout, this edition has been specifically developed for the U.S. market. It provides the latest US codes and standards, including API, ASME and ISA design codes and ANSI standards. It contains new discussions of conceptual plant design,

flowsheet development, and revamp design; extended coverage of capital cost estimation, process costing, and economics; and new chapters on equipment selection, reactor design, and solids handling processes. A rigorous pedagogy assists learning, with detailed worked examples, end of chapter exercises, plus supporting data, and Excel spreadsheet calculations, plus over 150 Patent References for downloading from the companion website. Extensive instructor resources, including 1170 lecture slides and a fully worked solutions manual are available to adopting instructors. This text is designed for chemical and biochemical engineering students (senior undergraduate year, plus appropriate for capstone design courses where taken, plus graduates) and lecturers/tutors, and professionals in industry (chemical process, biochemical, pharmaceutical, petrochemical sectors). New to this edition: Revised organization into Part I: Process Design, and Part II: Plant Design. The broad themes of Part I are flowsheet development, economic analysis, safety and environmental impact and optimization. Part II contains chapters on equipment design and selection that can be used as supplements to a lecture course or as essential references for students or practicing engineers working on design projects. New discussion of conceptual plant design, flowsheet development and revamp design Significantly increased coverage of capital cost estimation, process costing and economics New chapters on equipment selection, reactor design and solids handling processes New sections on fermentation, adsorption, membrane separations, ion exchange and chromatography Increased coverage of batch processing, food, pharmaceutical and biological processes All equipment chapters in Part II revised and updated with current information Updated throughout for latest US codes and standards, including API, ASME and ISA design codes and ANSI standards Additional worked examples and homework problems The most complete and up to date coverage of equipment selection 108 realistic commercial design projects from diverse industries A rigorous pedagogy assists learning, with detailed worked examples, end of chapter exercises, plus supporting data and Excel spreadsheet calculations plus over 150 Patent References, for downloading from the companion website Extensive instructor resources: 1170 lecture slides plus fully worked solutions manual available to adopting instructors The Fourth Edition of Applied Process Design for Chemical and Petrochemical Plants Volume 2 builds upon the late Ernest E. Ludwig's classic chemical engineering process design manual. Volume Two focuses on distillation and packed towers, and presents the methods and fundamentals of plant design along with supplemental mechanical and related data, nomographs, data charts and heuristics. The Fourth Edition is significantly expanded and updated, with new topics that ensure readers can analyze problems and find practical design methods and solutions to accomplish their process design objectives. A true application-driven book, providing clarity and easy access to essential process plant data and design information Covers a complete range of basic day-to-day petrochemical operation topics Extensively revised with new material on distillation process performance; complex-mixture fractionating, gas processing,

dehydration, hydrocarbon absorption and stripping; enhanced distillation types Computational Fluid Dynamics (CFD) is an important design tool in engineering and also a substantial research tool in various physical sciences as well as in biology. The objective of this book is to provide university students with a solid foundation for understanding the numerical methods employed in today's CFD and to familiarise them with modern CFD codes by hands-on experience. It is also intended for engineers and scientists starting to work in the field of CFD or for those who apply CFD codes. Due to the detailed index, the text can serve as a reference handbook too. Each chapter includes an extensive bibliography, which provides an excellent basis for further studies. Accompanied by CD-ROM: Simulation of process flowsheets. This comprehensive work shows how to design and develop innovative, optimal and sustainable chemical processes by applying the principles of process systems engineering, leading to integrated sustainable processes with 'green' attributes. Generic systematic methods are employed, supported by intensive use of computer simulation as a powerful tool for mastering the complexity of physical models. New to the second edition are chapters on product design and batch processes with applications in specialty chemicals, process intensification methods for designing compact equipment with high energetic efficiency, plantwide control for managing the key factors affecting the plant dynamics and operation, health, safety and environment issues, as well as sustainability analysis for achieving high environmental performance. All chapters are completely rewritten or have been revised. This new edition is suitable as teaching material for Chemical Process and Product Design courses for graduate MSc students, being compatible with academic requirements world-wide. The inclusion of the newest design methods will be of great value to professional chemical engineers. Systematic approach to developing innovative and sustainable chemical processes Presents generic principles of process simulation for analysis, creation and assessment Emphasis on sustainable development for the future of process industries Armed with this book, chemical engineers will have a collection of modern strategies for the design of chemical products and processes. It emphasizes a systematic approach and integrates product design more thoroughly throughout the chapters. New case studies on process design are included to make the concepts more relevant. The social aspects and economics of product design are introduced, and the Stage-Gate Product Development Process is explored in parallel tracks for several chemical products. The accompanying registration card grants access to a companion website that also provides chemical engineers with numerous examples of the simulator input and output, with frame-by-frame instructions to discuss the nature of the models provided for the processing units. Developed to provide students with guidance for models of experimental reporting and to fully explain to students how they might produce reports using their own data. Presents models that represent the full diversity of experimental engineering reports. Addresses the importance of data by providing detailed explanations of the standards that apply to graphical data displays and by explaining some of the

tricks that professionals use to integrate data displays into reports. Product and Process Design: Driving Innovation is a comprehensive textbook for students and industrial professionals. It treats the combined design of innovative products and their innovative manufacturing processes, providing specific methods for BSc, MSc, PDEng and PhD courses. Students, industrial innovators and managers are guided through all design steps in all innovation stages (discovery, concept, feasibility, development, detailed engineering, and implementation) to successfully obtain novel products and their novel processes. The authors' decades of innovation experience in industry, as well as in teaching BSc, MSc, and post-academic product and process design courses, thereby including the latest design publications, culminate in this book. This text explains the concepts behind process design. It uses a case study approach, guiding readers through realistic design problems, and referring back to these cases at the end of each chapter. Throughout, the author uses shortcut techniques that allow engineers to obtain the whole focus for a design in a very short period (generally less than two days). Ground-breaking text on chemical product design covering needs, ideas, selection, manufacture. This timely reference utilizes simplified computer strategies to analyze, develop, and optimize industrial food processes and offers procedures to assess various operating conditions, engineering and economic relationships, and the physical and transport properties of foods for the design of the most efficient food manufacturing technologies and eq A comprehensive and example oriented text for the study of chemical process design and simulation Chemical Process Design and Simulation is an accessible guide that offers information on the most important principles of chemical engineering design and includes illustrative examples of their application that uses simulation software. A comprehensive and practical resource, the text uses both Aspen Plus and Aspen Hysys simulation software. The author describes the basic methodologies for computer aided design and offers a description of the basic steps of process simulation in Aspen Plus and Aspen Hysys. The text reviews the design and simulation of individual simple unit operations that includes a mathematical model of each unit operation such as reactors, separators, and heat exchangers. The author also explores the design of new plants and simulation of existing plants where conventional chemicals and material mixtures with measurable compositions are used. In addition, to aid in comprehension, solutions to examples of real problems are included. The final section covers plant design and simulation of processes using nonconventional components. This important resource: Includes information on the application of both the Aspen Plus and Aspen Hysys software that enables a comparison of the two software systems Combines the basic theoretical principles of chemical process and design with real-world examples Covers both processes with conventional organic chemicals and processes with more complex materials such as solids, oil blends, polymers and electrolytes Presents examples that are solved using a new version of Aspen software, ASPEN One 9 Written for students and academics in the field of process design, Chemical Process Design and

Simulation is a practical and accessible guide to the chemical process design and simulation using proven software. Engineers often find themselves tasked with the difficult challenge of developing a design that is both technically and economically feasible. A sharply focused, how-to book, Engineering Economics and Economic Design for Process Engineers provides the tools and methods to resolve design and economic issues. It helps you integrate technical and economic decision making, creating more profit and growth for your organization. The book puts methods that are simple, fast, and inexpensive within easy reach. Author Thane Brown sets the stage by explaining the engineer's role in the creation of economically feasible projects. He discusses the basic economics of projects — how they are funded, what kinds of investments they require, how revenues, expenses, profits, and risks are interrelated, and how cash flows into and out of a company. In the engineering economics section of the book, Brown covers topics such as present and future values, annuities, interest rates, inflation, and inflation indices. He details how to create order-of-magnitude and study grade estimates for the investments in a project and how to make study grade production cost estimates. Against this backdrop, Brown explores a unique scheme for producing an Economic Design. He demonstrates how using the Economic Design Model brings increased economic thinking and rigor into the early parts of design, the time in a project's life when its cost structure is being set and when the engineer's impact on profit is greatest. The model emphasizes three powerful new tools that help you create a comprehensive design option list. When the model is used early in a project, it can drastically lower both capital and production costs. The book's uniquely industrial focus presents topics as they would happen in a real work situation. It shows you how to combine technical and economic decision making to create economically optimum designs and increase your impact on profit and growth, and, therefore, your importance to your organization. Using these time-tested techniques, you can design processes that cost less to build and operate, and improve your company's profit. Taking greater advantage of powerful computing capabilities over the last several years, the development of fundamental information and new models has led to major advances in nearly every aspect of chemical engineering. Albright's Chemical Engineering Handbook represents a reliable source of updated methods, applications, and fundamental concepts that will continue to play a significant role in driving new research and improving plant design and operations. Well-rounded, concise, and practical by design, this handbook collects valuable insight from an exceptional diversity of leaders in their respective specialties. Each chapter provides a clear review of basic information, case examples, and references to additional, more in-depth information. They explain essential principles, calculations, and issues relating to topics including reaction engineering, process control and design, waste disposal, and electrochemical and biochemical engineering. The final chapters cover aspects of patents and intellectual property, practical communication, and ethical considerations that are most relevant to engineers. From fundamentals to plant operations, Albright's Chemical

Engineering Handbook offers a thorough, yet succinct guide to day-to-day methods and calculations used in chemical engineering applications. This handbook will serve the needs of practicing professionals as well as students preparing to enter the field. Since its first development in the 1970s, Process Integration (PI) has become an important methodology in achieving more energy efficient processes. This pioneering handbook brings together the leading scientists and researchers currently contributing to PI development, pooling their expertise and specialist knowledge to provide readers with a comprehensive and up-to-date guide to the latest PI research and applications. After an introduction to the principles of PI, the book reviews a wide range of process design and integration topics ranging from heat and utility systems to water, recycling, waste and hydrogen systems. The book considers Heat Integration, Mass Integration and Extended PI as well as a series of applications and case studies. Chapters address not just operating and capital costs but also equipment design and operability issues, through to buildings and supply chains. With its distinguished editor and international team of expert contributors, Handbook of Process Integration (PI) is a standard reference work for managers and researchers in all energy-intensive industries, as well as academics with an interest in them, including those designing and managing oil refineries, petrochemical and power plants, as well as paper/pulp, steel, waste, food and drink processors. This pioneering handbook provides a comprehensive and up-to-date guide to the latest process integration research and applications Reviews a wide range of process design and integration topics ranging from heat and utility systems to water, recycling, waste and hydrogen systems Chapters also address equipment design and operability issues, through to buildings and supply chains Chemical Product Design: Towards a Perspective through Case Studies provides a framework for chemical product design problems which are clearly defined together with different solution approaches. This book covers the latest methods and tools currently available in the field and discusses future challenges that the chemical industry is faced with. It focuses on important issues of chemical product design and provides a good overview on industrial chemical product design problems through case studies supplied by leading experts. The editors of Chemical Product Design teach chemical product design at graduate level courses and also serve as consultants for various chemical companies. They have also developed experimental techniques for chemical product design as well as computer-aided design methods and tools. Highlights important issues of chemical product design through case studies Case studies supplied by leading experts in chemical product design Provides a complete framework for chemical product design Written by a highly regarded author with industrial and academic experience, this new edition of an established bestselling book provides practical guidance for students, researchers, and those in chemical engineering. The book includes a new section on sustainable energy, with sections on carbon capture and sequestration, as a result of increasing environmental awareness; and a companion website that includes problems, worked solutions, and

Excel spreadsheets to enable students to carry out complex calculations. Never HIGHLIGHT a Book Again! Virtually all of the testable terms, concepts, persons, places, and events from the textbook are included. Cram101 Just the FACTS101 studyguides give all of the outlines, highlights, notes, and quizzes for your textbook with optional online comprehensive practice tests. Only Cram101 is Textbook Specific. Accompanys: 9780470048955 . There are many comprehensive design books, but none of them provide a significant number of detailed economic design examples of typically complex industrial processes. Most of the current design books cover a wide variety of topics associated with process design. In addition to discussing flowsheet development and equipment design, these textbooks go into a lot of detail on engineering economics and other many peripheral subjects such as written and oral skills, ethics, "green" engineering and product design. This book presents general process design principles in a concise readable form that can be easily comprehended by students and engineers when developing effective flow sheet and control structures. Ten detailed case studies presented illustrate an in-depth and quantitative way the application of these general principles. Detailed economic steady-state designs are developed that satisfy economic criterion such as minimize total annual cost of both capital and energy or return on incremental capital investment. Complete detailed flow sheets and Aspen Plus files are provided. Then conventional PI control structures are be developed and tested for their ability to maintain product quality during disturbances. Complete Aspen Dynamics files are be provided of the dynamic simulations. Separation Process Principles with Applications Using Process Simulator, 4th Edition is the most comprehensive and up-to-date treatment of the major separation operations in the chemical industry. The 4th edition focuses on using process simulators to design separation processes and prepares readers for professional practice. Completely rewritten to enhance clarity, this fourth edition provides engineers with a strong understanding of the field. With the help of an additional co-author, the text presents new information on bioseparations throughout the chapters. A new chapter on mechanical separations covers settling, filtration and centrifugation including mechanical separations in biotechnology and cell lysis. Boxes help highlight fundamental equations. Numerous new examples and exercises are integrated throughout as well. Uses a large number of industrially-significant problems to convey an in-depth understanding of modern calculation procedures. Includes numerous topical examples and problems, and both conventional and SI units. The only guide from the makers of the ACT exam, packed with 5 genuine, full-length practice tests and 400 additional questions online This new edition includes: A NEW never-before-seen, full-length practice test with optional writing test (215 questions) 400 online questions that can be filtered and organized into custom practice sets Updated writing prompts and directions Real ACT test forms used in previous years The Official ACT Prep Guide 2019-2020 is the only guide from the makers of the exam and includes actual ACT test forms taken from past ACT exams. This updated edition includes 5 actual ACT tests (all

with optional writing test) to help you practice at your own pace and discover areas where you may need more work. The Official ACT Prep Guide 2019-2020 provides detailed explanations for every answer and practical tips on how to boost your score on the English, math, reading, science, and optional writing tests. You'll also get access to special online bonus content developed with the test taking experience in mind: Practice with 400 additional test questions that can be organized, filtered, and tracked for performance Take a closer look at test day, learn what to expect, and get familiar with the test-taking strategies that are right for you The Official ACT Prep Guide 2019-2020 is your definitive guide to getting ready for the ACT and feeling confident and comfortable on test day! Intensified processes have found widespread application in the chemical and petrochemical industries. The use of intensified systems allows for a reduction of operating costs and supports the "greening" of chemical processes. However, the design of intensified equipment requires special methodologies. This book describes the fundamentals and applications of these design methods, making it a valuable resource for use in both industry and academia. The new 4th edition of Seider's Product and Process Design Principles: Synthesis, Analysis and Design covers content for process design courses in the chemical engineering curriculum, showing how process design and product design are inter-linked and why studying the two is important for modern applications. A principal objective of this new edition is to describe modern strategies for the design of chemical products and processes, with an emphasis on a systematic approach. This fourth edition presents two parallel tracks: (1) product design, and (2) process design, with an emphasis on process design. Process design instructors can show easily how product designs lead to new chemical processes. Alternatively, product design can be taught in a separate course subsequent to the process design course. While various software packages have become essential for performing unit operations and other kinds of processes in chemical engineering, the fundamental theory and methods of calculation must also be understood to effectively test the validity of these packages and verify the results. Computer Methods in Chemical Engineering, Second Edition presents the most used simulation software along with the theory involved. It covers chemical engineering thermodynamics, fluid mechanics, material and energy balances, mass transfer operations, reactor design, and computer applications in chemical engineering. The highly anticipated Second Edition is thoroughly updated to reflect the latest updates in the featured software and has added a focus on real reactors, introduces AVEVA Process Simulation software, and includes new and updated appendixes. Through this book, students will learn the following: What chemical engineers do The functions and theoretical background of basic chemical engineering unit operations How to simulate chemical processes using software packages How to size chemical process units manually and with software How to fit experimental data How to solve linear and nonlinear algebraic equations as well as ordinary differential equations Along with exercises and references, each chapter contains a theoretical

description of process units followed by numerous examples that are solved step by step via hand calculation and computer simulation using Hysys/UniSim, PRO/II, Aspen Plus, and SuperPro Designer. Adhering to the Accreditation Board for Engineering and Technology (ABET) criteria, the book gives chemical engineering students and professionals the tools to solve real problems involving thermodynamics and fluid-phase equilibria, fluid flow, material and energy balances, heat exchangers, reactor design, distillation, absorption, and liquid extraction. This new edition includes many examples simulated by recent software packages. In addition, fluid package information is introduced in correlation to the numerical problems in book. An updated solutions manual and PowerPoint slides are also provided in addition to new video guides and UniSim program files. Traditionally, process design and control system design are performed sequentially. It is only recently displayed that a simultaneous approach to the design and control leads to significant economic benefits and improved dynamic performance during plant operation. Extensive research in issues such as 'interactions of design and control', 'analysis and design of plant wide control systems', 'integrated methods for design and control' has resulted in impressive advances and significant new technologies that have enriched the variety of instruments available for the design engineer in her endeavour to design and operate new processes. The field of integrated process design and control has reached a maturity level that mingles the best from process knowledge and understanding and control theory on one side, with the best from numerical analysis and optimisation on the other. Direct implementation of integrated methods should soon become the mainstream design procedure. Within this context 'The Integration of Process Design and Control', bringing together the developments in a variety of topics related to the integrated design and control, will be a real asset for design engineers, practitioners and researchers. Although the individual chapters reach a depth of analysis close to the frontier of current research status, the structure of the book and the autonomous nature of the chapters make the book suitable for a newcomer in the area. The book comprises four distinct parts: Part A: Process characterization and controllability analysis Part B: Integrated process design and control ⊣ Methods Part C: Plant wide interactions of design and control Part D: Integrated process design and control ⊣ Extensions By the end of the book, the reader will have developed a commanding comprehension of the main aspects of integrated design and control, the ability to critically assess the key characteristics and elements related to the interactions between design and control and the capacity to implement the new technology in practice. * This book brings together the latest developments in a variety of topics related to integrated design and control. * It is a valuable asset for design engineers, practitioners and researchers. * The structure of the book and the nature of its chapters also make it suitable for a newcomer to the field.

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