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Science And Engineering

Bioseparations Science And Engineering

*This systematically organized and
well-balanced book compresses*

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within the covers of a single volume the theoretical principles and techniques involved in bio-separations, also called downstream processing. These techniques are derived from a range of subjects, for example,

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physical chemistry, analytical chemistry, bio-chemistry, biological science and chemical engineering. Organized in its 15 chapters, the text covers in the first few chapters topics related to chemical engineering unit

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operations such as filtration, centrifugation, adsorption, extraction and membrane separation as applied to bioseparations. The use of chromatography as practiced at laboratory as well as industrial

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scale operation and related techniques such as gel filtration, affinity and pseudoaffinity chromatography, ion-exchange chromatography, electrophoresis and related methods have been discussed. The important

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applications of these techniques have also been highlighted. For Senior-level and graduate courses in Biochemical Engineering, and for programs in Agricultural and Biological Engineering or Bioengineering.

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This concise yet comprehensive text introduces the essential concepts of bioprocessing-internal structure and functions of different types of microorganisms, major metabolic pathways, enzymes, microbial genetics,

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kinetics and stoichiometry of growth and product information-to traditional chemical engineers and those in related disciplines. It explores the engineering principles necessary for bioprocess synthesis and design,

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and illustrates the application of these principles to modern biotechnology for production of pharmaceuticals and biologics, solution of environmental problems, production of commodities, and medical

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applications.

*Centrifugal Separations in
Biotechnology, Second Edition, is
the only book on the market
devoted to centrifugal separation
in biotechnology. Key topics
covered include a full introduction*

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to centrifugation, sedimentation and separation; detailed coverage of centrifuge types, including batch and semi-batch centrifuges, disk-stack and tubular decanter centrifuges; methods for increasing solids concentration;

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laboratory and pilot testing of centrifuges; selection and sizing of centrifuges; scale-up of equipment, performance prediction and analysis of test results using numerical simulation. Centrifugal

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Separations in Biotechnology, Second Edition, provides guidance on troubleshooting and optimizing centrifuges, and then goes on to explore the commercial applications of centrifuges in biotechnology. It gives detailed

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process information and data to assist in the development of particular processes from existing systems. It is of value to professionals in the chemical, bioprocess, and biotech sectors, and all those concerned with

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bioseparation, bioprocessing, unit-operations and process engineering. Provides a comprehensive guide to centrifuges, their optimal development, and their operation in the biotechnology industry

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*Updated throughout based on developments in industrial applications and advances in our understanding of centrifugal separations in biotechnology
Discusses applications for the separation of proteins, DNA,*

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*mitochondria, ribosomes,
lysosomes and other cellular
elements Includes new sections on
use of optimal polymer dosage in
waste treatment, new centrifuge
designs for applications in algae
processing, biopharma, and more*

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*Learn Chemical Reaction
Engineering through Reasoning,
Not Memorization Essentials of
Chemical Reaction Engineering is
the complete, modern
introduction to chemical reaction
engineering for today's*

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undergraduate students. Starting from the strengths of his classic Elements of Chemical Reaction Engineering, Fourth Edition, in this volume H. Scott Fogler added new material and distilled the essentials for undergraduate

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students. Fogler's unique way of presenting the material helps students gain a deep, intuitive understanding of the field's essentials through reasoning, using a CRE algorithm, not memorization. He especially

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focuses on important new energy and safety issues, ranging from solar and biomass applications to the avoidance of runaway reactions. Thoroughly classroom tested, this text reflects feedback from hundreds of students at the

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University of Michigan and other leading universities. It also provides new resources to help students discover how reactors behave in diverse situations- including many realistic, interactive simulations on DVD-

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*ROM. New Coverage Includes
Greater emphasis on safety:
following the recommendations of
the Chemical Safety Board (CSB),
discussion of crucial safety topics,
including ammonium nitrate CSTR
explosions, case studies of the*

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*nitroaniline explosion, and the T2
Laboratories batch reactor
runaway Solar energy
conversions: chemical, thermal,
and catalytic water spilling Algae
production for biomass Steady-
state nonisothermal reactor*

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*design: flow reactors with heat
exchange Unsteady-state
nonisothermal reactor design with
case studies of reactor explosions
About the DVD-ROM The DVD
contains six additional, graduate-
level chapters covering catalyst*

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decay, external diffusion effects on heterogeneous reactions, diffusion and reaction, distribution of residence times for reactors, models for non-ideal reactors, and radial and axial temperature variations in tubular

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reactions. Extensive additional DVD resources include Summary notes, Web modules, additional examples, derivations, audio commentary, and self-tests Interactive computer games that review and apply important

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*chapter concepts Innovative
"Living Example Problems" with
Polymath code that can be loaded
directly from the DVD so students
can play with the solution to get
an innate feeling of how reactors
operate A 15-day trial of*

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Polymath(tm) is included, along with a link to the Fogler Polymath site A complete, new AspenTech tutorial, and four complete example problems Visual Encyclopedia of Equipment, Reactor Lab, and other intuitive

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*tools More than 500 PowerPoint
slides of lecture notes Additional
updates, applications, and
information are available at
www.umich.edu/~essen and
www.essentialsofcre.com.
Capillary Gel Electrophoresis*

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*Handbook of Bioseparations
Membrane Processes in the
Pharmaceutical and
Biotechnological Field
Industrial Bioseparations
PRINCIPLES AND TECHNIQUES
Fundamentals and Applications in*

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Bioseparation Technology

Nutritional cosmetics is an emerging area of intense research and marketing and encompasses the concept that orally consumed dietary products can support healthier and more beautiful

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skin. There are numerous dietary ingredients now being marketed for their potential skin health and beauty benefits and many of these are supported by growing scientific evidence. The purpose of this book is

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to compile the scientific evidence showing the potential benefits of some of the more extensively researched ingredients. As far as possible, information about the benefits of ingredients consumed orally

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for skin health is presented. The information contained in this book will help provide insights into an emerging research area and provide scientific background for the potential clinical effectiveness for

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*some of the better
researched nutricosmetic
ingredients. ABOUT THE
EDITORS Aaron Tabor, M.D. is
the CEO of Physicians
Pharmaceuticals and author
of The Revival Slim &
Beautiful Diet. A graduate*

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*of the Johns Hopkins School
of Medicine, Dr. Tabor
oversees all clinical
research on the Revival Slim
& Beautiful Diet plan,
conducting randomized,
double-blinded, placebo-
controlled studies at*

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*leading hospitals in the
U.S. Areas of note include
weight loss, skin/hair/nail
appearance, energy,
menopause, PMS, cholesterol,
memory, and diabetic health.
He is also responsible for
directing new Revival*

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*product development based on
clinical research results.
Robert M. Blair, Ph.D. is
the Research Manager for
Physicians Pharmaceuticals,
Inc. and manages the daily
activities of the Research
and Nutrition departments.*

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*Dr. Blair received his Ph.D.
from Oklahoma State
University in the field of
Reproductive Physiology.
Before joining Physicians
Pharmaceuticals, Inc., he
worked as an Assistant
Professor of Comparative*

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*Medicine at the Wake Forest
University School of
Medicine where he examined
the effects of dietary soy
on cardiovascular health and
cognitive function. Reviews
the most-popular and most-
researched nutricosmetic*

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*ingredients Presents
information specifically
about the benefits of
ingredients consumed orally
for skin health Considers
the benefits of whey
protein, rosemary, soy - and
green tea and milk thistle,*

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*specifically, for protection
against sun damage and
photocarcinogenesis Provides
information on antioxidants,
incl: potential benefits of
botanical antioxidants;
carotenoids; coenzyme Q10;
healthy fruits; olive fruit;*

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*and natural enzymes
Current Trends and Future
Developments on (Bio-)
Membranes: Membrane
Processes in the
Pharmaceutical and
Biotechnological field
presents the main membrane*

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techniques along with their basic principles, mode of operations, and applications. It covers well-known techniques such as ultrafiltration and membrane chromatography, while also exploring emerging membrane

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technologies which are finding their way in pharmaceutical and biotechnology industries, including membrane emulsification, membrane bioreactors, and solvent-resistant nanofiltration.

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State-of-the-art applications of membrane systems in areas such as drug delivery and virus removal are also investigated by leading experts in the field.

Current Trends and Future

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Developments on (Bio-) Membranes: Membrane Processes in the Pharmaceutical and Biotechnological field is a definitive reference for academics, post-graduates, and researchers in the

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subjects of biochemical engineering, pharmaceuticals, and biotechnology. It is also useful to R&D companies and institutions in these areas, specifically those interested in bioseparations,

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*biopurification,
bioproduction, and drug
delivery. Offers an overview
of classical membrane-based
separation techniques such
as ultrafiltration,
microfiltration and virus
filtration Discusses*

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*emerging membrane-based
separation techniques such
as nofiltration in the
presence of solvent,
membrane emulsification and
membrane crystallization
Outlines their applications
to bioseparation,*

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*biopurification and
bioproduction Includes
examples in the production
of vaccines, antibiotics,
biomolecules, drugs, DNA and
cells Lists membranes
systems for drug delivery
like liposomes, nanocapsules*

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*and bilayer membranes
Emerging Membrane Technology
for Sustainable Water
Treatment provides the
latest information on the
impending crisis posed by
water stress and poor
sanitation, a timely issue*

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that is one of the greatest human challenges of the 21st century. The book also discusses the use of membrane technology, a serious contender that can be used to confront the crisis on a global scale,

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*along with its specific uses
as a solution to this
escalating problem. Provides
a unique source on membrane
technology and its
application for water
treatment Focuses on
technologies designed for*

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*the treatment of seawater
and brackish water
Highlights the most
economically and
environmentally friendly
membrane technologies Lists
various technologies and
emphasizes their link to*

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*renewable energy, energy
efficiency, nanotechnology,
reuse, and recycle*

*This book is intended for
use of students who need to
learn the techniques of
protein purification, large-
scale processing and design,*

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*and scale-up for the
biotechnology and
pharmaceutical industries.
This book will fill the
present gap in the market
for an in-depth
bioseparations text. It
covers all the current*

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*techniques used by
researchers and industrial
professionals and is an
excellent source for
students and scientists.*

*Liquid Biphasic System
Bioseparations Engineering
Biochemical and*

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*Environmental Bioprocessing
Bioseparations Science and
Engineering*

*Membrane Technology and
Engineering for Water
Purification*

Timely and comprehensive, this

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book presents recent advances in magnetic nanomaterials research, covering the latest developments, including the design and preparation of magnetic nanoparticles, their physical and chemical properties as well as their

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applications in different fields, including biomedicine, magnetic energy storage, wave-absorbing and water remediation. By allowing researchers to get to the forefront developments related to magnetic nanomaterials in various

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disciplines, this is invaluable reading for the nano, magnetic, energy, medical, and environmental communities. Industrial Bioseparations offers comprehensive coverage of bioseparations including all unit

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operations. This new book offers a careful balance between the fundamentals of bioseparations processing and the practical applications in industry today. It is laid out in a methodical way with preliminary chapters covering

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general approaches to bioseparations for commercially important biomacromolecules, thermodynamics and mass transfer principles, and following chapters addressing unit operations such as filtration and chromatography. Lab

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experiments are included which emphasize obtaining scale up parameters as well as commonly used operating conditions are included.

Bioseparation Engineering is meant for undergraduate and the

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postgraduate student community pursuing careers in Life Sciences. It concentrates on the more recent methods and techniques for separating components and products of the biotechnology industry. Each chapter deals with a

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specific type or area of application and includes information on the basic principles, industrial equipment available, commercial applications and an overview of current research and development. Main objective of the book is to

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provide in-depth knowledge of the subject in an interesting and paramount simple way

The emergence and refinement of techniques in molecular biology has changed our perceptions of medicine, agriculture and

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environmental management. Scientific breakthroughs in gene expression, protein engineering and cell fusion are being translated by a strengthening biotechnology industry into revolutionary new products and services. Many a

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student has been enticed by the promise of biotechnology and the excitement of being near the cutting edge of scientific advancement. However, graduates trained in molecular biology and cell manipulation soon realise that

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these techniques are only part of the picture. Reaping the full benefits of biotechnology requires manufacturing capability involving the large-scale processing of biological material. Increasingly, biotechnologists are being

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employed by companies to work in co-operation with chemical engineers to achieve pragmatic commercial goals. For many years aspects of biochemistry and molecular genetics have been included in chemical engineering

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curricula, yet there has been little attempt until recently to teach aspects of engineering applicable to process design to biotechnologists. This textbook is the first to present the principles of bioprocess engineering in a way that is

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accessible to biological scientists. Other texts on bioprocess engineering currently available assume that the reader already has engineering training. On the other hand, chemical engineering textbooks do not consider examples

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from bioprocessing, and are written almost exclusively with the petroleum and chemical industries in mind. This publication explains process analysis from an engineering point of view, but refers exclusively to the treatment

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of biological systems. Over 170 problems and worked examples encompass a wide range of applications, including recombinant cells, plant and animal cell cultures, immobilised catalysts as well as traditional

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fermentation systems. * * First book to present the principles of bioprocess engineering in a way that is accessible to biological scientists * Explains process analysis from an engineering point of view, but uses worked examples

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relating to biological systems *
Comprehensive, single-authored *
170 problems and worked examples
encompass a wide range of
applications, involving
recombinant plant and animal cell
cultures, immobilized catalysts, and

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traditional fermentation systems *
13 chapters, organized according to
engineering sub-disciplines, are
grouped in four sections -
Introduction, Material and Energy
Balances, Physical Processes, and
Reactions and Reactors * Each

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chapter includes a set of problems and exercises for the student, key references, and a list of suggestions for further reading * Includes useful appendices, detailing conversion factors, physical and chemical property data, steam

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tables, mathematical rules, and a list of symbols used * Suitable for course adoption - follows closely curricula used on most bioprocessing and process biotechnology courses at senior undergraduate and graduate levels.

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Drug Delivery

BIOSPERATIONS

Current Trends and Future
Developments on (Bio-)

Membranes

Engineering Principles for Drug
Therapy

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Engineering Processes for
Bioseparations

ESCAPE-31

Downstream bioprocesses have a significant role to play in the creation of a sustainable biobased economy, enabling the creation of new products

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and systems from the more sustainable bioprocessing of natural products. Liquid Biphasic System: Fundamentals and Applications in Bioseparation Technology explores in detail the fundamental processes and applications of this new separation system, aiding in the understanding of

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the basic principles of the technique and offering constructive criticisms of the latest findings. Including coverage of the background, principles, mechanisms, and applications, Liquid Biphasic System addresses how to adapt the technology for the purification of useful compounds with

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greater cost efficiency and greener processing. It is essential reading for bioprocess engineers, biochemical engineers, biosystem engineers, chemists, and microbiologists working in the fields of bioprocessing.

Researchers, scientists, and engineers concerned with the selection and

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evaluation of alternative bioseparation processes will find the book particularly useful. Provides information and examples of advanced separations in a single source Includes detailed descriptions of novel bioseparation systems Covers the latest technologies related to

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advanced liquid–liquid separation and their applications in various industries The use of biotechnology in chemical synthesis offers up numerous advantages to the engineer in the process industries, but it also presents a number of fundamental challenges and difficulties which impinge directly

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on separation process requirements. The use of biochemical separations has grown significantly during the past decade, and is especially used in process industries such as healthcare and food processing. However it is becoming increasingly more important in areas such as recycling and waste-

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water treatment and as industry shifts towards cleaner processes biochemical separations will continue to grow. The two main objectives of this book are to focus on the application of existing separation process techniques to the recovery and purification of biologically derived

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products and to examine the state of knowledge of new techniques which have future potential. Within these objectives the complexities and breadth of problems associated with biological separations are discussed, specific engineering techniques are featured and their adaptation to

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biochemical separations are highlighted.

The Leading Integrated Chemical Process Design Guide: Now with New Problems, New Projects, and More More than ever, effective design is the focal point of sound chemical engineering. Analysis, Synthesis, and

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Design of Chemical Processes, Third Edition, presents design as a creative process that integrates both the big picture and the small details—and knows which to stress when, and why. Realistic from start to finish, this book moves readers beyond classroom exercises into open-ended, real-world

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process problem solving. The authors introduce integrated techniques for every facet of the discipline, from finance to operations, new plant design to existing process optimization. This fully updated Third Edition presents entirely new problems at the end of every chapter. It also

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adds extensive coverage of batch process design, including realistic examples of equipment sizing for batch sequencing; batch scheduling for multi-product plants; improving production via intermediate storage and parallel equipment; and new optimization techniques specifically for

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batch processes. Coverage includes
Conceptualizing and analyzing
chemical processes: flow diagrams,
tracing, process conditions, and more
Chemical process economics:
analyzing capital and manufacturing
costs, and predicting or assessing
profitability Synthesizing and

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optimizing chemical processing:
experience-based principles,
BFD/PFD, simulations, and more
Analyzing process performance via I/O
models, performance curves, and
other tools Process troubleshooting
and “debottlenecking” Chemical
engineering design and society: ethics,

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professionalism, health, safety, and new “green engineering” techniques Participating successfully in chemical engineering design teams Analysis, Synthesis, and Design of Chemical Processes, Third Edition, draws on nearly 35 years of innovative chemical engineering instruction at West

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Virginia University. It includes suggested curricula for both single-semester and year-long design courses; case studies and design projects with practical applications; and appendixes with current equipment cost data and preliminary design information for eleven chemical

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processes—including seven brand new to this edition.

With coverage that draws from diverse disciplines, *Systems Engineering Tools and Methods* demonstrates how, using integrated or concurrent engineering methods, you can empower development teams.

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Copiously illustrated with figures, charts, and graphs, the book offers methods, frameworks, techniques, and tools for designing, implementing, and managing

Principles, Practice, and Economics
Bioprocessing for Value-Added
Products from Renewable Resources

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Trends and Developments

Fundamentals, Synthesis and
Applications

Application, Systems Design and
Operation

Separation Processes in
Biotechnology

Unlike extensive major reference

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works or handbooks, Chemical Engineering: Trends and Developments provides readers with a ready-reference to latest techniques in selected areas of chemical engineering where research is and will be focused in the future.

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**These areas are: bioseparations;
particle science and design;
nanotechnology; and reaction
engineering. The aim of the book is
to provide academic and R&D
researchers with an overview of the
main areas of technical development**

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and how these techniques can be applied. Each chapter focuses on a technique, plus a selection of applications or examples of where the technique could be applied.

The rapid growth of industries has resulted in the generation of high

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**volume of solid and liquid waste.
Today, there is a need of Clean and
Green technology for the sustainable
waste management. Biochemical and
Environmental Bioprocessing:
Challenges and Developments
explore the State-of-art green**

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technologies to manage the waste and to recover value added products. Microbes play an important role in the bioremediation. Bioprocess engineering an interdisciplinary connects the Science and Technology. The bioconversion and

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bioremediation is essentially required for the management of various hazardous substances in the environment. This book will give an intensive knowledge on the application of Biochemical and Bioprocess technologies for the eco-

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**friendly management of pollution.
This book serves as a fundamental to
the students, researchers,
academicians and Engineers
working in the area of
Environmental Bioremediation and
in the exploration of various**

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**bioproducts from waste. Features
Reviews various biological methods
for the treatment of effluents from
Industries by using biomass and
biopolymers. Highlights the
applications of various bioreactors
like Anaerobic Sequential Batch**

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Reactor, Continuously stirred anaerobic digester, Up-flow anaerobic sludge blanket reactor, Fluidized and expanded bed reactors. Presents the cultivation of algae in Open Pond, Closed loop System, and Photo-bioreactors for

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bioenergy production. Discusses the intensified and integrated biorefinery approach by Microwave Irradiation, Pyrolysis, Acoustic cavitation, Hydrodynamic cavitation, Electron beam irradiation, High pressure Autoclave reactor, Steam

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**explosion and photochemical
oxidation. Outlines the usage of
microbial fuel cell (MFC) for the
production bioelectricity generation
in different modules Tubular MFC,
Stacked MFC, Separate electrode
modules Cutting edge research of**

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**synthesis of biogenic nanoparticles
and Pigments by green route for the
health care and environment
management.**

**This manual contains necessary and
useful information and data in an
easily accessible format relating to**

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the use of membranes. Membranes are among the most important engineering components in use today, and each year more and more effective uses for membrane technologies are found - for example: water purification, industrial

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effluent treatment, solvent dehydration by per-vaporation, recovery of volatile organic compounds, protein recovery, bioseparations and many others. The pace of change in the membrane industry has been accelerating

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rapidly in recent years, occasioned in part by the demand of end-users, but also as a result of the investment in R&D by manufacturers. To reflect these changes the author has obtained the latest information from some of the leading suppliers in the

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business. In one complete volume this unique handbook gives practical guidance to using selected membrane processes in individual industries while also providing a useful guide to equipment selection and usage.

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**Engineering Oxford University Press,
USA**

**Separation of Molecules,
Macromolecules and Particles**

Nutritional Cosmetics

Challenges and Developments

Analysis, Synthesis and Design of

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Chemical Processes

31st European Symposium on

Computer Aided Process

Engineering

Biofuels Engineering Process

Technology, Second Edition

Edited to avoid duplication and favor

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comprehensiveness, 20 contributors detail the recovery, separation, and purification operations of bioprocess technology. Individual chapters in this classic yet still highly relevant work emphasize concepts that are becoming more and more important when

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applied to the large scale versions of techniques that are considered well established. Aside from fully discussing processes, Separation Processes in Biotechnology includes sections on concentration separation and operation, purification operations,

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and product release and recovery. It also discusses plant operation and equipment and delves into economic considerations

From the author of the classic reference, Die Design Handbook, Die Maintenance Handbook crystallizes

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lessons that have been learned through years of scrupulous problem solving in countless shops around the globe. It goes beyond typical solutions to common tool and die problems. It gives effective maintenance strategies, so trouble can be avoided early in the

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game. Learn how costly die repairs can be avoided when required tasks are applied at scheduled times during the die maintenance process. This book guides the reader through the basics of the die operation, and then prescribes the correct maintenance procedures

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for each critical task, including those never before put to print.

Preceded by: Bioseparations science and engineering / Roger G. Harrison ... [et al.]. c2003.

Published in 1988: It is the purpose of this book to outline and detail the

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*many steps which are involved in
bringing a fermentation product to
market.*

*Centrifugal Separations in
Biotechnology*

Principles and Practice

Fermentation Processes Engineering in

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the Food Industry

*Comprehensive Membrane Science and
Engineering*

*Principles of Bioseparations
Engineering*

*Systems Engineering Tools and
Methods*

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Bioseparations engineering deals with the scientific and engineering principles involved in large-scale separation and purification of biological products. It is a key component of most chemical engineering/biotechnology/bioprocess

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engineering programmes. This book discusses the underlying principles of bioseparations engineering written from the perspective of an undergraduate course. It covers membrane based bioseparations in much more detail

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than some of the other books on bioseparations engineering. Based largely on the lecture notes the author developed to teach the course, this book is especially suitable for use as an undergraduate level textbook, as

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most other textbooks are targeted at graduate students.

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with the product. Fully updated processes for the production of renewable and environmentally safe biofuels This thoroughly revised guide presents a complete and up-to-date introduction to biofuels process technology.

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Written by a team of industry-leading experts, Biofuels Engineering Process Technology, Second Edition shows, step by step, how renewable feedstocks are processed and how biofuels are refined. You will explore the entire

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spectrum of biofuel processes, including the production of ethanol from sugarcane and corn, biodiesel from animal fats and plant oils, and methane by anaerobic digestion. The book clearly explains newly developed technologies for the

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production of drop-in biofuels and the use of microbial fuel cells to produce electricity. Coverage includes:

- An introduction to biofuel engineering processes
- Harvesting energy from biochemical reactions
- Microbial modeling of biofuel

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production • Biofuels feedstocks •
Ethanol • Biodiesel • Drop-in
biofuels • Biological production of
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Capillary Gel Electrophoresis and
Related Microseparation

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Techniques covers all theoretical and practical aspects of capillary gel electrophoresis. It also provides an excellent overview of the key application areas of nucleic acid, protein and complex carbohydrate analysis, affinity-based

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methodologies, micropreparative aspects and related microseparation methods. It not only gives readers a better understanding of how to utilize this technology, but also provides insights into how to determine

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which method will provide the best technical solutions to particular problems. This book can also serve as a textbook for undergraduate and graduate courses in analytical chemistry, analytical biochemistry, molecular biology and

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biotechnology courses. Covers all theoretical and practical aspects of capillary gel electrophoresis
Excellent overview of the key applications of nucleic acid, protein and complex carbohydrate analysis, affinity-based

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methodologies, micropreparative aspects and related microseparation methods Teaches readers how to use the technology and select methods that are ideal for fundamental problems Can serve as a textbook for

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rational design of many of these biomaterials it is necessary to have an understanding of polymer chemistry and polymer physics. Equally important to those two fields is a quantitative understanding of the principles that

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govern rates of drug transport, reaction, and disappearance in physiological and pathological situations. This book is a synthesis of these principles, providing a working foundation for those in the field of drug delivery. It covers

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advanced drug delivery and
contemporary biomaterials.

Handbook of Industrial Membranes

Beauty from Within

Die Maintenance Handbook

Bioprocess Engineering Principles

Bioprocess Engineering

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graduate studies and the
biotechnology industry
Knowledge of the genetic basis of
biological functioning continues to
grow at an astronomical rate, as
do the challenges and
opportunities of applying this

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information to the production of therapeutic compounds, specialty biochemicals, functional food ingredients, environmentally friendly biocatalysts, and new bioproducts from renewable resources. While genetic

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engineering of living organisms transforms the science of genomics into treatments for cancer, diabetes, and heart disease, or products for industry and agriculture, the science and technology of bioseparations are

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products. Mechanistic analysis and engineering design methods are given for: * Isocratic and gradient chromatography * Sedimentation, centrifugation, and filtration * Membrane systems * Precipitation and

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crystallization Topics addressed within this framework are: stationary phase selection; separations development; modeling of ion exchange, size exclusion, reversed phase, hydrophobic interaction, and

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Resources provides a timely review of new and unconventional techniques for manufacturing high-value products based on simple biological material. The book discusses the principles underpinning modern industrial

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industry before describing the various organisms that are suitable for bioprocessing - from bacteria to algae - as well as their unique characteristics. This is followed by a discussion of novel, experimental bioprocesses, such as

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the production of medicinal chemicals, the production of chiral compounds and the design of biofuel cells. The book concludes with examples where biological, renewable resources become an important feedstock

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for large-scale industrial production. This book is suitable for researchers, practitioners, students, and consultants in the bioprocess and biotechnology fields, and for others who are interested in biotechnology,

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engineering, industrial microbiology and chemical engineering. ·Reviews the principles underpinning modern industrial biotechnology ·Provides a unique collection of novel bioprocesses for a sustainable

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maintenance; process control; plant start-up; and operation and troubleshooting. It is supplemented by case studies and engineering rules-of-thumb. The author is a chemical engineer with extensive experience in the field,

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and his technical knowledge and practical know-how in the water purification industry are summarized succinctly in this new edition. This book will inform you which membranes to use in water purification and why, where and

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osmosis, electrodialysis, and
diffusion dialysis Hybrid
Membrane Systems expanded to
cover zero liquid discharge, salt
recovery and removal of trace
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commercial success of biotechnology products is highly dependent on the successful development and application of high-powered separation and purification methods. In this practical and authoritative

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handbook, the separation of proteins, nucleic acids, and oligonucleotides from biological matrices is covered from analytical to process scales. Also included in a chapter on the separation of monoclonal antibodies, which have

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found numerous uses as therapeutic and diagnostic agents. Analytical techniques include an interesting montage of chromatographic methods, capillary electrophoresis, isoelectric focusing, and mass spectrometry.

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Among separation and purification methods, liquid-liquid distribution, displacement chromatography, expanded bed adsorption, membrane chromatography, and simulated moving bed chromatography are covered at

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length. Regulatory and economic considerations are addressed, as are plant and process equipment and engineering process control. A chapter on future developments highlights the application of DNA chip arrays as well as evolving

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guidebook for separation scientists working in the pharmaceutical and biotechnology industries, academia, and government laboratories. Key Features * Covers bioseparations of proteins, nucleic acids, and monoclonal antibodies *

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developments

The 31st European Symposium on
Computer Aided Process
Engineering: ESCAPE-31, Volume
50 contains the papers presented
at the 31st European Symposium of
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Engineering (ESCAPE) event held in Istanbul, Turkey. It is a valuable resource for chemical engineers, chemical process engineers, researchers in industry and academia, students and consultants in the chemical

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Basic Concepts

Essentials of Chemical Reaction
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membrane science and technology - from basic phenomena to the most advanced applications and future perspectives.

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the development of process-intensification strategies and to the stimulation of industrial growth. The work presents researchers and industrial managers with an indispensable tool

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potable water Includes
contributions and case
studies from
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in this multi-billion

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dollar field Takes a
unique, multidisciplinary
approach that stimulates
research in hybrid
technologies for current
(and future) life-saving
applications (artificial

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organs, drug delivery)
The bioseparation
engineering of today
includes downstream
process engineering such
as waste water, material
and gas treatment. Taking

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this tendency into
account, bioseparation
engineers gathered in
Japan as a special
research group under the
main theme of "Recovery
and Recycle of Resources

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to Protect the Global Environment". The scope of this book is based on the conference, and deals not only with recent advances in bioseparation engineering in a narrow

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sence, but also the environmental engineering which includes waste water treatment and bioremediation. The contributors of this book cover many disciplines

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such as chemical engineering, analytical chemistry, biochemistry, and microbiology.

Bioseparation Engineering will stimulate young engineers and scientists

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who will develop
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