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***For Senior-level and
graduate courses in
Biochemical Engineering,
and for programs in
Agricultural and
Biological Engineering or
Bioengineering. This***

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***concise yet
comprehensive text
introduces the essential
concepts of bioprocessing-
internal structure and
functions of different
types of microorganisms,***

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***major metabolic
pathways, enzymes,
microbial genetics,
kinetics and
stoichiometry of growth
and product information-
to traditional chemical***

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***engineers and those in
related disciplines. It
explores the engineering
principles necessary for
bioprocess synthesis and
design, and illustrates the
application of these***

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***principles to modern
biotechnology for
production of
pharmaceuticals and
biologics, solution of
environmental problems,
production of***

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commodities, and medical applications.

This text outlines the fluid and thermodynamic principles that apply to all classes of turbomachines, and the

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***material has been
presented in a unified
way. The approach has
been used with successive
groups of final year
mechanical engineering
students, who have***

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***helped with the
development of the ideas
outlined. As with these
students, the reader is
assumed to have a basic
understanding of fluid
mechanics and***

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thermodynamics.

***However, the early
chapters combine the
relevant material with
some new concepts, and
provide basic reading
references. Two related***

objectives have defined the scope of the treatment. The first is to provide a general treatment of the common forms of turbo machine, covering basic fluid

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***dynamics and
thermodynamics of flow
through passages and
over surfaces, with a brief
derivation of the
fundamental governing
equations. The second***

objective is to apply this material to the various machines in enough detail to allow the major design and performance factors to be appreciated. Both objectives have been

met by grouping the machines by flow path rather than by application, thus allowing an appreciation of points of similarity or difference in approach. No attempt

has been made to cover detailed points of design or stressing, though the cited references and the body of information from which they have been taken give this sort of

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information. The first four chapters introduce the fundamental relations, and the succeeding chapters deal with applications to the various flow paths.

Fermentation is a theme widely useful for food, feed and biofuel production. Indeed each of these areas, food industry, animal nutrition and energy production,

has considerable presence in the global market. Fermentation process also has relevant applications on medical and pharmaceutical areas, such as antibiotics

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production. The present book, Fermentation Processes, reflects that wide value of fermentation in related areas. It holds a total of 14 chapters over diverse

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***areas of fermentation
research.***

***Bioprocess Engineering
for a Green Environment
examines numerous
bioprocesses that are
crucial to our day-to-day***

life, specifically the major issues surrounding the production of energy relating to biofuels and waste management. The nuance of this discussion is reflected by the text's

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***chapter breakdown,
providing the reader with
a fulsome investigation of
the energy sector; the
importance of third-
generation fuels; and the
application of micro- and***

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***macroalgae for the
production of biofuels.
The book also provides a
detailed exploration of
biocatalysts and their
application to the food
industry; bioplastics***

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***production; conversion of
agrowaste into
polysaccharides; as well
as the importance of
biotechnology in bio-
processing. Numerous
industries discharge***

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***massive amounts of
effluents into our rivers,
seas, and air systems. As
such, two chapters are
dedicated to the
treatment of various
pollutants through***

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biological operation with hopes of achieving a cleaner, greener, environment. This book represents the most comprehensive study of bioprocessing—and its

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***various applications to
the
environment—available
on the market today. It
was furthermore written
with various researchers
in mind, ranging from***

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***undergraduate and
graduate students
looking to enhance their
knowledge of the topics
presented to scholars and
engineers interested in
the bioprocessing field, as***

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to day-to-day living. Is
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biocatalysts and their
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bioplastics production.

***Examines the unique
capabilities of bioprocess
engineering and its
ability to treat various
pollutants. .***

Kinetics and Reactors

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***Separation Process
Engineering
Fundamentals of Modern
Bioprocessing
Chemical and Bioprocess
Engineering
Aircraft Engineering***

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Principles

Suitable for undergraduates, postgraduates and professionals, this is a comprehensive text on physical and chemical equilibrium. De Nevers is also the author of Fluid

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Mechanics for Chemical
Engineers.

Hollow Fiber Membranes:
Fabrication and Applications
focuses on the fabrication and
applications of hollow fiber
membranes. The book amply

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discusses the fundamental theories and practical applications of hollow fiber membranes, covering membrane formation mechanisms, hollow fiber spinning techniques, and spinneret design and module

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fabrication. In addition, novel membrane processes and applications of hollow fiber membranes are introduced. Elaborates membrane formation mechanisms Illustrates novel hollow fiber fabrication

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techniques and processes

Specifies practical spinneret

design and module fabrication

Reviews hollow fiber membranes

spun from specialty polymers

Discusses state-of-the-art hollow

fiber membrane applications

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The biology, biotechnology, chemistry, pharmacy and chemical engineering students at various universities and engineering institutions are required to take the Biochemical Engineering course either as an

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elective or compulsory subject. This book is written keeping in mind the need for a text book on afore subject for students from both engineering and biology backgrounds. The main feature of this book is that it contains

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the solved problems, which help the students to understand the subject better. The book is divided into three sections: Enzyme mediated bioprocess, whole cell mediated bioprocess and the engineering principle in

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bioprocess. Dr. Rajiv Dutta is Professor in Biotechnology and Director, Amity Institute of Biotechnology, Lucknow. He earned his M. Tech. in Biotechnology and Engineering from the Department of Chemical

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Engineering, IIT, Kharagpur and
Ph.D. in Bioelectronics from
BITS, Pilani. He has taught
Biochemical Engineering and
Biophysics to B.E., M.E. and
M.Sc. level student carried out
advanced research in the area of

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Ion channels at the Department of Botany at Oklahoma State University, Stillwater and Department of Biological Sciences at Purdue University, West Lafayette, IN. He also holds the position of Nanion

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Technologies Adjunct Research
Professor at Research Triangle
Institute, RTP, NC. He had
received various awards
including JCI Outstanding Young
Person of India and ISBEM Dr.
Ramesh Gulrajani Memorial

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Award 2006 for outstanding research in electro physiology. Aircraft Engineering Principles is the essential text for anyone studying for licensed A&P or Aircraft Maintenance Engineer status. The book is written to

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meet the requirements of JAR-66/ECAR-66, the Joint Aviation Requirement (to be replaced by European Civil Aviation Regulation) for all aircraft engineers within Europe, which is also being continuously

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harmonised with Federal Aviation Administration requirements in the USA. The book covers modules 1, 2, 3, 4 and 8 of JAR-66/ECAR-66 in full and to a depth appropriate for Aircraft Maintenance Certifying

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Technicians, and will also be a valuable reference for those taking ab initio programmes in JAR-147/ECAR-147 and FAR-147. In addition, the necessary mathematics, aerodynamics and electrical principles have been

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included to meet the requirements of introductory Aerospace Engineering courses. Numerous written and multiple choice questions are provided at the end of each chapter, to aid learning.

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Modeling For Chemical
Engineers

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Fundamentals of Biochemical
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Principles of Bioseparations
Engineering

***This book is based on a 1981
German language edition
published by Springer
Verlag, Vienna, under the
title Bioprozesstechnik.***

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Philip Manor has done the translation, for which I am deeply grateful. This book differs from the German edition in many ways besides language. It is substantially enlarged and updated, and

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***examples of computer
simulations have been
added together with other
appendices to make the work
both more comprehensive
and more practical. This
book is the result of over 15***

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***years of experience in
teaching and research. It
stems from lectures that I
began in 1970 at the
Technical University of Graz,
Austria, and continued at
the University of Western***

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***Ontario in London, Canada,
1980; at the Free University
of Brussels, 1981; at
Chalmers Technical
University in G6teborg,
Sweden; at the Academy of
Sciences in Iena, East***

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Germany; at the "Haus der Technik" in Essen, West Germany, 1982; at the Academy of Science in Sofia, Bulgaria; and at the Technical University of Delft, Netherlands, 1986.

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The main goals of this book are, first, to bridge the gap that always exists between basic principles and applied engineering practice, second, to enhance the integration between

biological and physical phenomena, and, third, to contribute to the internal development of the field of biotechnology by describing the process-oriented field of bioprocess technology.

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***Designed for
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students, and industry
practitioners, Bioseparations
Science and Engineering
fills a critical need in the
field of bioseparations.***

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Current, comprehensive, and concise, it covers bioseparations unit operations in unprecedented depth. In each of the chapters, the authors use a consistent method of

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***explaining unit operations,
starting with a qualitative
description noting the
significance and general
application of the unit
operation. They then
illustrate the scientific***

***application of the operation,
develop the required
mathematical theory, and
finally, describe the
applications of the theory in
engineering practice, with
an emphasis on design and***

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scaleup. Unique to this text is a chapter dedicated to bioseparations process design and economics, in which a process simular, SuperPro Designer® is used to analyze and evaluate the

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***production of three
important biological
products. New to this second
edition are updated
discussions of moment
analysis, computer
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***chromatography, and
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as well as revised problem
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sustainability of industrial processes. The book is ideal for adoption in process design and sustainability courses. It is also a valuable guidebook to process, chemical, and environmental

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performance, identifying
root causes of problems and
opportunities for
improvement, designing
integrated solutions,
enhancing profitability,***

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resources, and preventing
pollution. Written by one of
the world's foremost
authorities in integrated
process design and
sustainability, the new***

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applications that include
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conservation, synthesis of
innovative processes,
retrofitting of existing***

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assessment of water, energy,
and water-energy-nexus
systems, and reconciliation
of various sustainability
objectives***

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Mechanics

***Hollow Fiber Membranes
Produced by the Center for
Chemical Process Safety
(CCPS), this volume provides
examples of management
systems for chemical process***

safety programs that are currently in place or that have been successfully used at chemical plants. The guidelines are directed toward all those individuals who are res

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Bioprocess 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 e

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engineering/biotechnology/bioprocess engineering programmes. This book discusses the underlying principles of bioseparations engineering written from the perspective of an

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undergraduate course. It covers membrane based bioseparations in much more detail than some of the other books on bioseparations engineering. Based largely on the lecture notes the author

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developed to teach the course, this book is especially suitable for use as an undergraduate level textbook, as most other textbooks are targeted at graduate students.

This is the second edition of

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***the text "Bioreaction
Engineering Principles" by
Jens Nielsen and John
Villadsen, originally published
in 1994 by Plenum Press (now
part of Kluwer). Time runs fast
in Biotechnology, and when***

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Kluwer Plenum stopped reprinting the first edition and asked us to make a second, revised edition we happily accepted. A text on bioreactions written in the early 1990's will not reflect the

enormous development of experimental as well as theoretical aspects of cellular reactions during the past decade. In the preface to the first edition we admitted to be newcomers in the field. One of

us (JV) has had 10 more years of job training in biotechnology, and the younger author (IN) has now received international recognition for his work with the hottest topics of "modem"

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***biotechnology. Furthermore
we are happy to have induced
Gunnar Liden, professor of
chemical reaction engineering
at our sister university in
Lund, Sweden to join us as co-
author of the second edition.***

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His contribution, especially on the chemical engineering aspects of "real" bioreactors has been of the greatest value. Chapter 8 of the present edition is largely unchanged from the first edition. We wish

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***to thank professor Martin
Hjortso from LSU for his
substantial help with this
chapter.***

***The emergence and
refinement of techniques in
molecular biology has***

***changed our perceptions of
medicine, agriculture and
environmental management.
Scientific breakthroughs in
gene expression, protein
engineering and cell fusion are
being translated by a***

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***strengthening biotechnology
industry into revolutionary
new products and services.
Many a 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 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
employed by companies to***

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***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

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engineering in a way that is 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 from bioprocessing, and are written almost exclusively with the petroleum and chemical industries in mind. This

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publication explains process analysis from an engineering point of view, but refers exclusively to the treatment of biological systems. Over 170 problems and worked examples encompass a wide

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***range of applications,
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bioprocess engineering in a way that is accessible to biological scientists * Explains process analysis from an engineering point of view, but uses worked examples relating to biological systems *

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***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 -
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references, and a list of
suggestions for further
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and chemical property data,
steam tables, mathematical
rules, and a list of symbols
used * Suitable for course
adoption - follows closely***

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senior undergraduate and
graduate levels.***

***Fundamental Concepts for
First-Year Students***

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***Design, Manufacture, and
Nanoscale Engineering
Fundamentals and
Applications to Industrial
Pollution Prevention,
Resource Conservation, and
Profitability Enhancement***

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***Bioprocess Engineering
Chemical and Bio-process
Control***

*Bioprocess Engineering involves
the design and development of
equipment and processes for the*

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manufacturing of products such as food, feed, pharmaceuticals, nutraceuticals, chemicals, and polymers and paper from biological materials. It also deals with studying various biotechnological processes. "Bioprocess Kinetics

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*and Systems Engineering" first of
its kind contains systematic and
comprehensive content on
bioprocess kinetics, bioprocess
systems, sustainability and reaction
engineering. Dr. Shijie Liu reviews
the relevant fundamentals of*

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*chemical kinetics-including batch
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bioprocess engineers to engage in the analysis, optimization, design and consistent control over biological and chemical transformations. The quantitative treatment of bioprocesses is the central theme of this book, while

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more advanced techniques and applications are covered with some depth. Many theoretical derivations and simplifications are used to demonstrate how empirical kinetic models are applicable to complicated bioprocess systems.

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Contains extensive illustrative drawings which make the understanding of the subject easy
Contains worked examples of the various process parameters, their significance and their specific practical use
Provides the theory of

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concepts to complex metabolic
pathways Incorporates
sustainability concepts into the
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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 based upon sound fundamental

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enhancements to the theoretical
coverage of the subject Increased
number and variety of examples
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problems with degree-of-diffi culty
rating added Expanded and*

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predictive control Self-assessment
questions and problems at the end
of most sections with answers listed
in the appendix Bio-process control
coverage: Background and history
of bio-processing and bio-process*

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control added to the introductory chapter Discussion and analysis of the primary bio-sensors used in biotech industries added to the chapter on control loop hardware Significant proportion of examples and homework problems in the text deal

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*with bio-processes Section on
troubleshooting bio-process control
systems included Bio-related
process models added to the
modeling chapter Supplemental
material: Visual basic simulator of
process models developed in text*

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reference combines the classical analysis and modern applications of applied mathematics for chemical engineers. The book introduces traditional techniques for solving ordinary differential equations (ODEs), adding new

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material on approximate solution methods such as perturbation techniques and elementary numerical solutions. It also includes analytical methods to deal with important classes of finite-difference equations. The last half

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discusses numerical solution techniques and partial differential equations (PDEs). The reader will then be equipped to apply mathematics in the formulation of problems in chemical engineering. Like the first edition, there are

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*many examples provided as
homework and worked examples.*

*Biotechnology for Biofuel
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*Includes Mass Transfer Analysis
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Processing*

This welcome new edition covers bioprocess engineering principles for the reader with a limited engineering background. It explains

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Application of engineering concepts is illustrated in areas of modern biotechnology such as recombinant

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of biochemical processes. It is

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essential to operate a system properly. A description of enzymatic reaction kinetics is followed by cell growth kinetics to determine several kinetic parameters. Operations and analyses of several biochemical processes are included to determine

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their special. The book also covers the determination of several operational parameters, such as volumetric mass transfer coefficient, mixing time, death rate constant, chemical oxygen demand, and heat of combustion. This book provides a

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novel description of the experimental protocol to find out several operational parameters of biochemical processes. A comprehensive collection of numerous experiments based on fundamentals, it focuses on the

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instead of being a general overview of the two topics, Fundamentals of Chemical and Bioprocess Engineering will identify and focus on specific areas in which attaining a solid competency is desired. This strategy is the direct result of studies

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