
Book Reviews

Reviewed by Janez Grum

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1 **The Chemistry Companion**

by: A.C. Fischer-Cripps

Published 2012

by CRC Press, Taylor & Francis Group,

6000 Broken Sound Parkway NW,

Suite 300, Boca Raton, London, New York, 181 pp

ISBN: 987-1-4398-3088-8 (Paperback)

Like the author's other companion books, provides-high quality information in unique one-page-per-topic presentations that do not overburden and distract with excessive details. The book offers concise summaries of general chemistry concepts, easily accessible in a convenient, reader-friendly format.

Suitable as an introduction or study guide, this companion presents the minimum of what readers need to know to understand the subject. It emphasises the physics underlying chemistry. By looking at chemistry processes from a physics point of view, readers can better appreciate what is happening from the chemical perspective that is usually found in traditional chemistry books.

Features

- Provides a physical understanding of chemical concepts
- Presents clear explanations of difficult material, working through any inconsistencies in understanding
- Uses a convenient format for checking formulas and definitions
- Includes self-contained information on each page, assuming little prior knowledge.

The author focuses on the structure of matter, chemical components and bonds, the periodic table, states of matter, thermodynamics, reaction rates, carbon chemistry, biochemistry, and chemical, ionic, and electronic equilibria. Each topic is covered in a single-page outline format with just enough detail to enable a good understanding of the subject.

2 The Materials Physics Companion
by: A.C. Fischer-Cripps
Published 2015, 2nd Edition
by CRC Press, Taylor & Francis Group,
6000 Broken Sound Parkway NW, Suite 300,
Boca Raton, FL 33487-2742, Boca Raton,
London, New York, 224 pp
ISBN-13: 987-1-4665-1782-2 (Paperback)

Updated and expanded with new topics, *The Materials Physics Companion, 2nd Edition* puts the physics of the solid state within the reach by offering an easy-to-navigate pathway from basic knowledge through to advanced concepts. In an accessible way, this addition illustrates how electrical and magnetic properties of matter arise from the basic principles of quantum mechanics.

Features

- Provides succinct but detailed accounts of materials physics at an intermediate level
- Serves as a revision aid or supplement to more comprehensive solid-state and materials physics texts
- Enables students to quickly locate essential equations and review the necessary theory
- Presents the topics in a concise format with numerous diagrams and annotated equations
- Includes quantum physics, x-ray diffraction, polarisability, magnetic properties, ferrites, and more.

The book uses the unique signature style of the author's other companion books, providing detailed graphics, simple and clear explanations of difficult concepts, and annotated mathematical treatments. It covers quantum mechanics, x-ray analysis, solid-state physics, the mechanical and thermal properties of solids, the electrical and magnetic properties of solids, and superconductivity, assuming no prior knowledge of these advanced areas.

**3 The Materials Physics Companion: Mathematical Methods
or Physicists and Engineers**
by: A.C. Fischer-Cripps
Published 2015, 2nd Edition
by CRC Press, Taylor & Francis Group,
6000 Broken Sound Parkway NW, Suite 300,
Boca Raton, FL 33487-2742, Boca Raton,
London, New York, 286 pp
ISBN-13: 987-1-4665-158712 (Paperback)

Updated and expanded with new topics, *The Mathematics Companion: Mathematical Methods for Physicists and Engineers, 2nd Edition* presents the essential core of

mathematical principles needed by scientists and engineers. Starting from the basic concepts of trigonometry, the book covers calculus, differential equations, and vector calculus. A new chapter on applications discusses how we see objects ‘mathematically’ with the eye, how quantum mechanics works, and more.

Features

- Enables students to quickly locate essential equations and review the necessary theory
- Presents the topics in a concise format with numerous diagrams and annotated equations
- Relates the mathematical principles to real-life physical problems
- Covers the essentials as well as more advanced mathematics, such as transforms, differential equations, and numerical methods
- Describes applications in mechanics, signal processing, optics, and other areas

The book presents essential mathematics ideas from basic to advanced level and uses unique and educational approach that is the signature style of the author’s companion books. The author explains mathematical concepts clearly, concisely, and visually, illustrating how scientists use the language of mathematics to describe and communicate physical principles.

4 The Materials Physics Companion

by: A.C. Fischer-Cripps

Published 2015, 2nd Edition

**by CRC Press, Taylor & Francis Group,
6000 Broken Sound Parkway NW, Suite 300,**

**Boca Raton, FL 33487-2742, Boca Raton,
London, New York, 544 pp**

ISBN-13: 987-1-4665-1779-0 (Paperback)

Updated and expanded with new topics, *The Physics Companion, 2nd Edition* offers a unique and educational approach to learning physics at a level suitable for first-year science students. This new edition expands the presentation to include senior topics, such as statistical mechanics, quantum physics, and nuclear physics.

Features

- Provides succinct but detailed accounts of the major topics studied in science and engineering programs
- Enables students to quickly locate essential equations and review the necessary theory
- Presents the topics in a concise format with numerous diagrams and annotated equations
- Includes a numerical example at the end of each chapter.

This useful book serves students from the beginning of their studies to well into their future careers. It provides detailed graphics, simple and clear explanations of difficult concepts, and annotated mathematical treatments in a one-page-per-topic format that is the signature style of the author's companion books.

5 The Electronics Companion: Devices and Circuits for Physicists and Engineers

by: A.C. Fischer-Cripps

Published 2015, 2nd Edition

**by CRC Press, Taylor & Francis Group,
6000 Broken Sound Parkway NW, Suite 300,
Boca Raton, FL 33487-2742, Boca Raton,
London, New York, 310 pp
ISBN-13: 987-1-4665-5266-1 (Paperback)**

Updated and expanded with new topics, *The Electronics Companion: Devices and Circuits for Physicists and Engineers, 2nd Edition* presents a full course in introductory electronics using a unique and educational presentation technique that is the signature style of the author's companion books. This concise yet detailed book covers introductory electrical principles (DC and AC circuits), the physics of electronics components, circuits involving diodes and transistors, transistors amplifiers, filtering, operational amplifiers, digital electronics, transformers, instrumentation, and power supplies.

Features

- Allows students to understand the basic principles of electronics
- Serves as a revision aid or supplement to standard texts in electrical/electronic engineering
- Enables students to quickly locate essential equations and review the necessary theory
- Presents the topics in a concise format with numerous diagrams and annotated equations
- Includes many worked examples and review questions that help students attain a practical understanding of the topics
- Provides a complete laboratory course of practical experiments designed to illustrate the concepts and allow students to acquire valuable practical experience.

The level of coverage is introductory but at enough depth to enable students to undertake simple circuit design and construction. The book includes tutorial problems and a comprehensive set of laboratory experiments requiring conventional components and test equipment.

6 Military Laser Technology and Systems

by: D.H. Titterton

Published 2015

by Artech House

685 Caton Street, Norwood, MA 02062, Boston, London, 651 pp

ISBN-13: 987-1-60807-778-6

The critical aim of this book is to provide an insight into the physical principles of the device technology that underpins many laser-based military systems in one form or another. From this knowledge a deeper understanding of the fundamental requirements and the potential performance, as well as limitations of such systems, may be assessed, given the appropriate operational parameters.

There is a vast range of such military systems that continues to expand, much like our universe. This book concentrates on military laser-based systems that are either in relatively common usage or close to development; there is a chapter giving a brief description of some emerging applications, which are expected to become operational in the near term.

The book contains the following chapters:

Part I: Fundamentals

- Military Laser Technology and Systems
- Laser Action, Components and Definition of Terms
- Laser Devices for Military Applications
- Beam-Director Technology
- Laser-Beam Propagation
- Radiometry, Testing and Evaluation of Laser Systems.

Part II: Military Systems

- Laser Directed-Energy-Weapon Systems
- Laser-Beam Electro-Optical Countermeasures
- Laser Directed-Infrared Countermeasures (Laser Jammers)
- Laser Range Finders
- Laser-Based Targeting
- Laser Designation, Guidance and Fuzing
- Laser-Based Remote Sensing
- Free-Space Optical Communication Networks
- Navigation Sensors
- Other Emerging Military Applications

- Safe Use of Laser and Legislation
- Education and Training.

APPENDIX

- The development of Infrared Threat-Seeker-Technology
- Jammer Development
- Missile-Warning System Technology
- Rules of Thumb and Guidelines.

The information presented in this book makes the assumption that the reader has a basic appreciation of quantum theory (i.e., the existence of the photon and energy levels within atoms and molecules) and the associated physical principles.

A selected bibliography is given at the end of each chapter, so that the more interested or curious reader can access more detailed information.

This book is not intended to compete with the many excellent books that have been published describing the basis of the operation of a laser and the fundamentals of laser design.

This book is intended for use by scientists, engineers, and technologists, with varying degrees of training spanning undergraduate students through the graduate level to postdoctoral students and research fellows as well as well-experienced people, this book aims to provide an insight to the technology or its applications, whereas for the more experienced engineers, the book should provide a guide to requirements and the derivation thereof, as well as an indication of alternative of emerging applications of the military laser technology.

7 Innovation Technological Catch-Up: The Changing Geography of Wine Production

by: E. Giuliani, A. Morrison and R. Rabellotti

Published 2011

by Edward Elgar

Cheltenham, UK, Northampton, MA, USA, 220 pp

by Edward Elger Publishing, Inc.

**William Pratt House, 9 Dewey Court,
Northampton, Massachusetts 01060, USA**

A catalogue record for this book is available from the British Library

Library of Congress Control Number: 2011925708

ISBN: 987 1 84844 994 7 (cased)

“In the New World, viticulture and wine production has had to develop with verve and enthusiasm, to be able to survive and to flourish. In countries like Chile and Argentina, the continuing decline of domestic wine consumption has forced technicians and entrepreneurs to conquer the world with innovation and technology, to produce wines of international taste and to attract potential buyers to these markets. This book is a very professional account of these phenomena, which have profoundly changed the marketing of wines in the past 20 years”.

The book contains the following chapters:

- Innovation and technological catch-up in the wine industry: an introduction
 - *PART I: CATCHING UP IN THE WINE INDUSTRY*
 - Catching-up trajectories in the wine sector
 - The changing geography of science in wine: evidence from emerging countries
 - Contributions of the innovation system to Australia's wine industry growth.
 - *PART II: DRIVERS OF TECHNOLOGICAL CATCH-UP IN THE WINE INDUSTRY: UNIVERSITIES, PUBLIC-PRIVATE INSTITUTIONS, RESEARCHERS AND FIRMS*
 - University involvement in wine region development: a comparative case study between Universidad de Talca (Chile) and Universidad de Cuyo (Argentina)
 - Recombining to compete: public-private institutions, shifting networks and the remaking of the Argentine wine sector
 - Bridging researchers and the openness of wine innovation systems in Chile and South Africa
 - Knowledge, science and interactions in South Africa's wine industry
 - What have we learnt from the wine industry? Some concluding remarks.

8 Challenges for European Innovation Policy: Cohesion and Excellence from Schumpeterian Perspective

by: S. Radosevic and A. Kaderabkova

Published 2011

by Edward Elgar

Cheltenham, UK, Northampton, MA, USA, 221 pp

by Edward Elgar Publishing, Inc.

William Pratt House, 9 Dewey Court,

Northampton, Massachusetts 01060, USA

A catalogue record for this book is available from the British Library

Library of Congress Control Number: 2011925704

ISBN: 978 1 84980 309 0 (cased)

This book uniquely applies the Schumpeterian innovation policy perspective to the countries of Central and Eastern Europe (CEE). A broadly defined framework of the science, technology, innovation and growth system underpins the empirical and conceptual analysis of the critical issues including demand, FDI, finance and education.

Specifically, the expert contributors address the (in) capacity of CEE to play a more significant role in the knowledge-based competitiveness of the EU. They question whether it is possible to bolster this capacity with innovation-/technology-/industry-specific policies, and discuss the changes required at EU and individual country levels to

remove sector- and industry-specific obstacles to greater competitiveness based on innovation. Policies are analysed from the perspective of growth, and the conclusions drawn are relevant to education, the labour market and competition policy.

The book contains the following chapters:

- Innovation policy in multi-tier Europe: Introduction
- Challenges of converging innovation policies in a multi-tier Europe: a neo-Schumpeterian perspective
- Fostering growth in CEE countries: a country-tailored approach to growth policy
- Sectoral innovation modes and level of economic development: implications for innovation policy in the new member states
- EU innovation policy: one size doesn't fit all!
- Attracting and embedding R&D in multinational firms: policy options for EU new member states
- Innovation in EU CEE: the role of demand-based policy
- Innovation policy options for 'catching up' by the EU CEE member states.

This highly original, explicit and systematic study will prove an illuminating read for academics, researchers, students and policy makers focusing on a range of areas including economics, heterodox economics, European studies, technology and innovation.

9 Handbook on the Economic Complexity of Technological Change

by: C. Antonelli

Published 2011

by Edward Elger

Cheltenham, UK, Northampton, MA, USA, 566 pp

by Edward Elgar Publishing, Inc.

William Pratt House, 9 Dewey Court,

Northampton, Massachusetts 01060, USA

A catalogue record for this book is available from the British Library

Library of Congress Control Number: 2010934011

ISBN: 987 1 84844 256 6 (cased)

This comprehensive and innovative Handbook applies the tools of the economics of complexity to analyse the causes and effects of technological and structural change. It grafts the intuitions of the economics of complexity into the tradition of analysis based upon the Schumpeterian and Marshallian legacies.

The handbook elaborates the notion of innovation as an emerging property of the organised complexity of an economic system, and provides the basic tools to understand the recursive dynamics between the emergence of innovation and the unfolding of organised complexity. In so doing, it highlights the role of organisational thinking in explaining the introduction of innovations and the dynamics of structural change.

The book contains the following chapters:

- *Part I: Introduction*
 - The economic complexity of technology change: knowledge interaction and path dependence.
- *Part II: The economic complexity of innovation*
 - Complexity and innovation dynamics
 - Complexity in the theory of the developing firm
 - The persistence of innovation and path dependence
 - The symbiotic theory of innovation: knowledge creation and evaluation of the capitalist system.
- *Part III: The economic complexity of knowledge*
 - Knowledge, complexity and networks
 - The dynamic of technological knowledge: from linearity to recombination
 - Complexity and the coordination of technological knowledge: the case of innovation platforms
 - Causes, consequences and dynamics of ‘complex’ distributions of technological activities: the case of prolific inventors
 - The biomedical workforce in the US: an example of positive feedbacks
 - University – industry interactions: the unresolved puzzle
 - A functional theory of technology and technological change.
- *Part IV: The economic complexity of structural change and development*
 - Macroeconomics: a unified approach to system complexity and evaluation
 - Notes on a complexity theory of economic development
 - Innovation networks: formation, performance and dynamics
 - The complex interaction between global production networks, digital information systems and international knowledge transfers
 - The complex dynamics of economic development.
- *Part V: Lessons and implications for economic policy*
 - Coevolution, emergence and economic development: some lessons from the Israeli and Mexican experience
 - Network models of innovation process and policy implications
 - Government as entrepreneur: examples from US technology policy.

With a new methodological approach to the economics of technological change, this wide-ranging volume will become the standard reference for postgraduates, academics

and practitioners in the fields of evolutionary economics, complexity economics and the economics of innovation.

10 Creative Work beyond the Creative Industries: Innovation, Employment and Education

by: G. Hearn, R. Bridgstock, B. Goldsmith and J. Rodgers

Published 2014

by Edward Elger

Cheltenham, UK, Northampton, MA, USA, 255 pp

by Edward Elgar Publishing, Inc.

William Pratt House, 9 Dewey Court,

Northampton, Massachusetts 01060, USA

A catalogue record for this book is available from the British Library

Library of Congress Control Number: 2013958026

This book is available electronically in the ElgarOnline.com

Business Subject Collection, E-ISBN 987 1 78254 570 5

ISBN: 987 1 78254 569 9

Creative workers are employed in sectors outside the creative industries often in greater numbers than within the creative field. This is the first book to explore the phenomena of the embedded creative and creative services through a range of sectors, disciplines, and perspectives.

Despite the emergence of the creative worker, there is very little known about the work life of these ‘creatives’, and why companies seek to employ them. This book asks: how does creative work actually ‘embed’ into a service or product supply chain? What are creative services? Which industries are they working in? This collection explores these questions in relation to innovation, employment and education, using various methods and theoretical approaches, in order to examine the value of the embedded creative and to discover the implications of education and training for creative workers.

The book contains the following chapters:

Creative work beyond the creative industries: an introduction

- *PART I: FOUNDATIONAL ISSUES*
 - Creative labour and its discontents: A reappraisal
 - Compensating differentials in Creative Industries and occupations: some evidence from HILDA
 - Creative digital services in education, mining and manufacturing: pursuing innovation through interoperability
 - London’s creative workforce.
- *PART II: CASE STUDIES OF EMBEDDED CREATIVE EMPLOYMENT*
 - Embedded creatives in Australian healthcare – an update
 - Embedded creatives in the Australian manufacturing industry
 - Embedded digital creatives

- Embedded digital creative workers and Creative Services in banking
- Looking inside the portfolio to understand the work of creative Workers: a study of creatives in Perth.
- *PART III: EDUCATION, LEARNING AND CAREERS*
- Learning processes in Creative Services teams: towards a dynamic systems theory
- Translating creative skills: an example of Youthworx Media for marginalised youth
- Developing agency in the creative career: a design-based framework for work integrated learning
- Graduate careers in journalism, media and communications within and outside the sector: early career outcomes, trajectories and capabilities.

This book will be of interest to practitioners, policy makers and industry leaders in the creative industries, in particular digital media, application development, design, journalism, media and communication. It will also appeal to academics and scholars of innovation, cultural studies, business management and labour studies.

11 Green Tribology: Green Surface Engineering and Global Warming

by: R. Chattopadhyay

Published 2014

by ASM International

Materials Park, Ohio 44073-0002, asminternational.org, 336 pp

Library of Congress Control Number 2014932926

ISBN-13: 978-1-62708-064-4

ISBN 10: 1-62708-064-3

SAN: 204-7586

An alternative technoecologically viable option for reducing greenhouse gas emissions is to make industries more energy efficient by minimising energy losses due to tribological interactions. Green-engineering processes, such as green tribology and green surface engineering, enable efficient conversion of energy from one form to another. Green technologies provide enormous opportunities for limiting global warming within a safe temperature zone and for conserving natural resources. The emphasis in green tribology and surface engineering is improvement in energy efficiency by reducing energy losses due to wear and friction. Green surface engineering protects the surface against wear and reduces friction. Green tribology and surface engineering extend the life span of critical components in severe wear environments. This leads to improvement in process efficiency, enables component operation in extreme conditions to further increase efficiency, and decreases the carbon footprint of the components. I have attempted to cover all of these areas in this book, with a view to minimising global warming. This book is designed to help industries reduce financial loss due to wear and friction and improve productivity and energy efficiency by producing green products with a low carbon footprint. The major emitting industries, such as power plants, transportation,

steel, cement, paper and pulp, and machine tool industries, can benefit most by improving energy efficiency. Industries paying for emission in excess of the specified limits should plan to become carbon neutral. This book should be of special interest to manufacturers and suppliers of surface-engineering consumables and equipment; wear-control service centres, including job shops and maintenance and growth shops attached to industries; and corporate (involved in corporate social responsibility). This book can provide valuable guidance to researchers engaged in new green technologies, both in academic institutes and research centres.

12 The Biomedical Engineering Handbook

by: J.D. Bronzion and D.R. Peterson

Published 2015

by CRC Press, Fourth Edition

Taylor & Francis Group, 6000 Broken Sound Parkway NW,

Suite 300, Boca Raton FL 33487-2742,

Boca Raton, London, New York, 23 chapters, 274 pp

ISBN-13: 978-1-4398-2530-3 (Hardback)

During the past eight years since the publication of the third edition – a three-volume set – of *The Biomedical Engineering Handbook*, the field of biomedical engineering has continued to evolve and expand. As a result, the fourth edition has been significantly modified to reflect state-of-the-field knowledge and applications in this important discipline and has been enlarged to a four-volume set:

- Volume I: *Biomedical Engineering Fundamentals* (5 chapters, 58 pages)

Biomedical Engineering Fundamentals, the first volume of the handbook, presents material from respected scientists with diverse backgrounds in physiological systems, biomechanics, biomaterials, bioelectric phenomena, and neuroengineering.

More than three dozen specific topics are examined, including cardiac biomechanics, the mechanics of blood vessels, cochlear mechanics, biodegradable biomaterials, soft tissue replacements, cellular biomechanics, neural engineering, electrical stimulation for paraplegia, and visual prostheses. The material is presented in a systematic manner and has been updated to reflect the latest applications and research findings.

- Volume II: *Medical Devices and Human Engineering* (5 chapters, 57 pages)

Medical Devices and Human Engineering, the second volume of the handbook, presents material from respected scientists with diverse backgrounds in biomedical sensors, medical instrumentation and devices, human performance engineering, rehabilitation engineering, and clinical engineering.

More than three dozen specific topics are examined, including optical sensors, implantable cardiac pacemakers, electrosurgical devices, blood glucose monitoring, human–computer interaction design, orthopedic prosthetics, clinical engineering program indicators, and virtual instruments in healthcare. The material is presented in a systematic manner and has been updated to reflect the latest applications and research findings.

- Volume III: Biomedical Signals, Imaging, and Informatics (4 chapters, 66 pages)

Biomedical Signals, Imaging, and Informatics, the third volume of the handbook, presents material from respected scientists with diverse backgrounds in biosignal processing, medical imaging, infrared imaging, and medical informatics.

More than three dozen specific topics are examined, including biomedical signal acquisition, thermographs, infrared cameras, mammography, computed tomography, positron-emission tomography, magnetic resonance imaging, hospital information systems, and computer-based patient records. The material is presented in a systematic manner and has been updated to reflect the latest applications and research findings.

- Volume IV: Molecular, Cellular, and Tissue Engineering (9 chapters, 93 pages)

Molecular, Cellular, and Tissue Engineering, the fourth volume of the handbook, presents material from respected scientists with diverse backgrounds in molecular biology, transport phenomena, physiological modelling, tissue engineering, stem cells, drug delivery systems, artificial organs, and personalised medicine.

More than three dozen specific topics are examined, including DNA vaccines, biomimetic systems, cardiovascular dynamics, biomaterial scaffolds, cell mechanobiology, synthetic biomaterials, pluripotent stem cells, haematopoietic stem cells, mesenchymal stem cells, nanobiomaterials for tissue engineering, biomedical imaging of engineered tissues, gene therapy, noninvasive targeted protein and peptide drug delivery, cardiac valve prostheses, blood substitutes, artificial skin, molecular diagnostics in personalised medicine, and bioethics.

More specifically, this fourth edition has been considerably updated and contains completely new sections, including

- Stem Cell Engineering
- Drug Design, Delivery Systems, and Devices
- Personalised Medicine

as well as a number of substantially updated sections, including

- Tissue Engineering (which has been completely restructured)
- Transport Phenomena and Biomimetic Systems
- Artificial Organs
- Medical Imaging
- Infrared Imaging
- Medical Informatics.

In addition, Volume IV contains a chapter on ethics because of its ever-increasing role in the biomedical engineering arts. Nearly all the sections that have appeared in the first three editions have been significantly revised. Therefore, this fourth edition presents an excellent summary of the status of knowledge and activities of biomedical engineers in the first decades of the 21st century. As such, it can serve as an excellent reference

for individuals interested not only in a review of fundamental physiology but also in quickly being brought up to speed in certain areas of biomedical engineering research. It can serve as an excellent textbook for students in areas where traditional textbooks have not yet been developed and as an excellent review of the major areas of activity in each biomedical engineering sub-discipline, such as biomechanics, biomaterials, bioinstrumentation, medical imaging, and so on. Finally, it can serve as the 'bible' for practicing biomedical engineering professionals by covering such topics as historical perspective of medical technology, the role of professional societies, the ethical issues associated with medical technology, and the FDA process.

13 Molecular, Cellular Tissue Engineering: The Biomedical Engineering Handbook

by: Joseph D. Bronzino and Donald R. Peterson

Published 2015

by CRC Press, Fourth Edition

Taylor & Francis Group, Boca Raton, London, New York, 1798 pp

by Taylor & Francis Group, LLC

ISBN-13: 987-1-4398-2530-3 (Hardback)

During the past eight years since the publication of the third edition – a three-volume set – of *The Biomedical Engineering Handbook*, the field of biomedical engineering has continued to evolve and expand. As a result, the fourth edition has been significantly modified to reflect state-of-the-field knowledge and applications in this important discipline and has been enlarged to a four-volume set:

- *Volume I: Biomedical Engineering Fundamentals*
- *Volume II: Medical Devices and Human Engineering*
- *Volume III: Biomedical Signals, Imaging, and Informatics*
- *Volume IV: Molecular, Cellular, and Tissue Engineering*

More specifically, this fourth edition has been considerably updated and contains completely new sections, including

- Stem Cell Engineering
- Drug Design, Delivery Systems, and Devices
- Personalised Medicine

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- Medical Imaging

- Infrared Imaging
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Biomedical engineering is now an important and vital interdisciplinary field. Biomedical engineers are involved in virtually all aspects of developing new medical technology. They are involved in the design, development, and utilisation of materials, devices (such as pacemakers, lithotripsy, etc.), and techniques (such as signal processing, artificial intelligence, etc.) for clinical research and use, and they serve as members of the healthcare delivery team (clinical engineering, medical informatics, rehabilitation engineering, etc.) seeking new solutions for the difficult healthcare problems confronting our society. To meet the needs of this diverse body of biomedical engineers, this handbook provides a central core of knowledge in those fields encompassed by the discipline. However, before presenting this detailed information, it is important to provide a sense of the evolution of the modern healthcare system and identify the diverse activities biomedical engineers perform to assist in the diagnosis and treatment of patients.

The book contains the following chapters:

- Molecular Biology
- Transport phenomena and Biomimetic System
- Physical Modelling, Simulation and Control
- Stem Cell Engineering: An Introduction
- Tissue Engineering
- Artificial Organs
- Drug Design, Delivery System, and Devices
- Personalised Medicine
- Ethics.

- 14 Biomedical, Signals, Imaging and Informatic: The Biomedical Engineering Handbook**
Published 2015
by: Joseph D. Bronzino and Donald R. Peterson
by CRC Press, Fourth Edition
Taylor & Francis Group, Boca Raton,
London, New York, 1404 pp
by Taylor & Francis Group, LLC
ISBN-13: 987-1-4398-2527-3 (Hardback)

Known as the bible of biomedical engineering, *The Biomedical Engineering Handbook, Fourth Edition*, sets the standard against which all other references of this nature are measured. As such, it has served as a major resource for both skilled professionals and novices to biomedical engineering.

Biomedical Signals, Imaging, and Informatics, the third volume of the handbook, presents material from respected scientists with diverse backgrounds in biosignal processing, medical imaging, infrared imaging, and medical informatics.

More than three dozen specific topics are examined, including biomedical signal acquisition, thermographs, infrared cameras, mammography, computed tomography, positron-emission tomography, magnetic resonance imaging, hospital information systems, and computer-based patient records. The material is presented in a systematic manner and has been updated to reflect the latest applications and research findings.

The book contains the following chapters:

- Biosignal Processing
- Medical Imaging
- Infrared Imaging
- Medical Informatics.

- 15 Biomedical, Engineering, Fundamentals: The Biomedical Engineering Handbook**
by: Joseph D. Bronzino and Donald R. Peterson
Published 2015
by CRC Press, Fourth Edition
Taylor & Francis Group, Boca Raton, London, New York, 1126 pp
by Taylor & Francis Group, LLC
ISBN-13: 987-1-4398-2518-1 (Hardback)

Known as the bible of biomedical engineering, *The Biomedical Engineering Handbook, Fourth Edition*, sets the standard against which all other references of this nature are measured. As such, it has served as a major resource for both skilled professionals and novices to biomedical engineering.

Biomedical Engineering Fundamentals, the first volume of the handbook, presents material from respected scientists with diverse backgrounds in physiological systems, biomechanics, biomaterials, bioelectric phenomena, and neuroengineering.

More than three dozen specific topics are examined, including cardiac biomechanics, the mechanics of blood vessels, cochlear mechanics, biodegradable biomaterials, soft tissue replacements, cellular biomechanics, neural engineering, electrical stimulation for paraplegia, and visual prostheses. The material is presented in a systematic manner and has been updated to reflect the latest applications and research findings.

The book contains the following chapters:

- Physiologic System
- Biomechanics
- Biomaterials
- Bioelectric Phenomena
- Neuroengineering.

16 Medical devices and Human Engineering: The Biomedical Engineering Handbook

by: Joseph D. Bronzino and Donald R. Peterson

Published 2015

by CRC Press, Fourth Edition

Taylor & Francis Group, Boca Raton, London, New York, 855 pp

by Taylor & Francis Group, LLC,

ISBN-13: 987-1-4398-2525-9 (Hardback)

Known as the bible of biomedical engineering, *The Biomedical Engineering Handbook, Fourth Edition*, sets the standard against which all other references of this nature are measured. As such, it has served as a major resource for both skilled professionals and novices to biomedical engineering.

Medical Devices and Human Engineering, the second volume of the handbook, presents material from respected scientists with diverse backgrounds in biomedical sensors, medical instrumentation and devices, human performance engineering, rehabilitation engineering, and clinical engineering.

More than three dozen specific topics are examined, including optical sensors, implantable cardiac pacemakers, electrosurgical devices, blood glucose monitoring, human-computer interaction design, orthopaedic prosthetics, clinical engineering program indicators, and virtual instruments in healthcare. The material is presented in a systematic manner and has been updated to reflect the latest applications and research findings.

The book contains the following chapters:

- Biomedical Sensors
- Medical Instruments and Devices

- Human Performance Engineering
- Rehabilitations Engineering
- Critical.

17 Engineering Writing by Design: Creating Formal Documents of Lasting Value

by: Edward J. Rothwell and Michael J. Cloud

Published 2014

by CRC Press

Taylor & Francis Group, Boca Raton, London, New York, 187 pp

by Taylor & Francis Group, LLC

ISBN-13: 987-1-4882-3431-2 (Paperback)

Engineering Writing by Design: Creating Formal Documents of Lasting Value demonstrates how effective writing can be achieved through engineering-based thinking. Based on the authors' combined experience as engineering educators, the book presents a novel approach to technical writing, positioning formal writing tasks as engineering design problems with requirements, constraints, protocols, standards, and customers (readers) to satisfy. Specially crafted for busy engineers and engineering students, this quick-reading, conversational text:

- Describes how to avoid logical fallacies and use physical reasoning to catch mistakes in claims
- Covers the essentials of technical grammar and style as well as the elements of mathematical exposition
- Emphasises the centrality of the target audience, and thus the need for clear and concise prose.

Engineering Writing by Design: Creating Formal Documents of Lasting Value addresses the specific combination of thinking and writing skills needed to succeed in modern engineering. Its mantra is: to write like an engineer, you must think like an engineer. Featuring illustrative examples, chapter summaries and exercises, quick-reference tables, and recommendations for further reading, this book is packed with valuable tips and information practicing and aspiring engineers need to become effective writers.

The book contains the following chapters:

- Introduction
- Clearly Understand the Goal
- Mindset for Technical Writing
- Avoid the Worst Thinking Traps
- Some Points of Grammar and Style
- Keep Your Reader in Mind
- Write Your Math Well

18 Mechanical Fastening, Joining and Assembly**by: James A. Speck****Published 2015****by CRC Press, Fourth Edition****Taylor & Francis Group, Boca Raton, London, New York, 368 pp****by Taylor & Francis Group, LLC****ISBN-13: 987-0-8247-5378-8 (alk. paper)**

A good design, quality parts, and properly executed assembly procedures and processes result in well-fastened assemblies. Utilising a combined knowledge of mechanical assembly engineering and fastening technology, the book provides readers with a solid understanding of mechanical fastening, joining, and assembly information. Based on the author's experience in the field, this updated mechanical arts guide and reference chronicles the technical progress since the first edition was published more than a decade ago.

The second edition addresses recent trends in the industry, and looks at new fastening technologies used in aerospace, automotive, and other key areas. It explains the fastening function in depth, and describes the types of fastening approaches that can be used effectively. The revised text expands on the presentation and review of fastened components, detailing the assembly, design, manufacturing, and installation of fastener products and procedures. It covers specific joining applications, including vibration, standard, and special materials; details environmental factors; and provides useful reference charts for future use.

What's New in the Second Edition:

- Provides an up-to-date selection of technologies
- Contains practical approaches to modern fastener technology
- Reviews engineering fundamentals with a focus on their application in the fastener industry
- Includes a section on fastener statics
- Expands on fastener manufacturing processes, most specifically cold heading and roll threading
- Adds fastener dynamics to draw attention to forces in motion (wind turbine hub turning in strong winds) and fastener strength of materials
- Extends review of the economics of fastening and provides some tools for engineering economics
- Examines the difference in static and dynamic strengths
- Considers fastener materials in this new century, provides some observations about the fastener laboratory, and discusses electrical theory
- Addresses sustainability, application product management, thermodynamics, energy systems, and new thought maps for application analysis
- Takes a look at a favourite application, D&D 100, and more.

The book is accessible to novices and experienced technologists and engineers, and covers the latest in fastener technology and assembly training.

The book contains the following chapters:

- Fastener Functions and Assembly Testing
- Fastener Types and Their Production
- Fastening and Joining Mechanics
- Economic Factors in Fastener/Assembly Decisions
- Assemblies under Dynamic Loading
- Assembly Sites and Systems
- Fastener Materials
- Environmental Factors and Corrosion
- Assembly Analysis
- Appendix A: Fastening, Joining, and Assembly Glossary
- Appendix B: Ingenious Fasteners and Assemblies
- Appendix C: Some Frequent Fastener Questions and Answers
- Appendix D: Article from *American Fastener Journal*
- Appendix E: Some Additional Problem Solution Ideas and Summary Thoughts.

19 CRC Handbook of Chemistry and Physics: A Ready-Reference Book of Chemical and Physical Data

by: W.M. Haynes, David R. Lide and Thomas J. Bruno

Published 2015, 2015–2016 96th Edition

by CRC Press

Taylor & Francis Group, Boca Raton, London, New York, 1587 pp

by Taylor & Francis Group, LLC

ISBN-13: 987-0-4822-6096-0 (Pack-Book and Ebook)

The 96th Edition of the Handbook includes new tables and major updates and expansions. A series highlighting the achievements of some of the major historical figures in chemistry and physics was initiated with the 94th edition. This series is continued with this edition which is focused on Lord Kelvin, Michael Faraday, John Dalton, and Robert Boyle. This series, which provides biographical information, a list of major achievements, and notable quotations attributed to each of the renowned chemists and physicists, will be continued in succeeding editions. Each edition will feature two chemists and two physicists. The following new tables have been added to this edition:

Section 1: Basic Constants, Units, and Conversion Factors

- Descriptive Terms for Solubility.

Section 8: Analytical Chemistry

- Stationary Phases for Porous Layer Open Tubular Columns
- Coolants for Cryotrapping
- Instability of HPLC Solvents
- Chlorine-Bromine Combination Isotope Intensities.

Section 16: Health and Safety Information

- Materials Compatible with and Resistant to 72 Percent Perchloric Acid
- Relative Dose Ranges from Ionising Radiation.

Significant updates and expansions of tables for the 96th Edition include the following:

Section 6: Fluid Properties

- Update and expansion of Sublimation Pressure of Solids
- Major update of Vapour Pressure of Fluids at Temperatures Below 300 K.

Section 7: Biochemistry

- Expansion of Structure and Functions of Some Common Drugs.

Section 8: Analytical Chemistry

- Minor update of Nuclear Spins, Moments, and Other Data Related to NMR Spectroscopy.

Section 9: Molecular Structure and Spectroscopy

- Update of Bond Dissociation Energies.

Section 11: Nuclear and Particle Physics

- Update of Summary Tables of Particle Properties
- Major update of Table of the Isotopes.

Section 14: Geophysics, Astronomy, and Acoustics

- Update of Major World Earthquakes
- Update of Atmospheric Concentration of Carbon Dioxide, 1958–2014
- Update of Global Temperature Trend, 1880–2014.

Section 15: Practical Laboratory Data

- Update of Dependence of Boiling Point on Pressure.

Section 16: Health and Safety Information

- Update of Threshold Limits for Airborne Contaminants.

*Appendix B: Update of Sources of Physical and Chemical Data***20 High-Resolution Imaging: Detectors and Applications****by: S.K. Saha****Published 2015****by Pan Stanford Publishing****Penthouse Level, Suntec Tower 3,****8 Temasek Boulevard, Singapore 038988, 565 pp****by Pan Stanford Publishing Pte. Ltd.****ISBN: 987-981-4613-27-9 (Hardcover)****ISBN: 987-981-4613-28-6 (eBook)**

Research in solid-state electronic imaging detector commenced at the end of the 1960s. Boyle and Smith (1970) introduced the concept of charge-coupled device (CCD). Soon CCDs replaced TV camera tubes for the photon-counting cameras using image intensifiers. However, the possibility to have a fully solid-state photon-counting camera is quite recent. Modern detectors with

- high sensitivity
- high selectivity and detectivity
- fast response
- high efficiency
- low noise
- high read-out speed play a key role in astronomical applications.

A photon-counting system allows the accurate photon centroiding and provides the dynamic range needed for measurements of source characteristics. At present, the large-format CCD and complementary metal oxide semiconductor array mosaics, electron-multiplication CCDs, electron avalanche photodiode arrays, quantum-well infrared photon detectors, etc., are available. However, the requirements of artefact-free photon shot-noise limited images include higher sensitivity and quantum efficiency, reduced noise that includes dark current, read-out and amplifier noise, smaller point spread functions, and higher spectral bandwidth.

The book contains the following chapters:

- Properties of Radiation
- Photoelectric Concept
- Concept of Laser
- Photon Detection Process
- Photodetectors

- Charge Transfer Devices
- Photon-Counting Systems
- Radiation Detectors for Infrared Wavelengths.

21 Resistive, Capacitive, Inductive, and Magnetic Sensor Technologies

by: Winncy Y. Du

Published 2015

by CRC Press

Taylor & Francis Group, 6000 Broken Sound Parkway NW,

Suite 300, Boca Raton FL 33487-2742,

Boca Raton, London, New York, 386 pp

Resistive, capacitive, inductive, and magnetic sensors comprise more than 70% of the sensor market today. For many years, there has been a strong need for a compressive book on sensors that combines the most important physical principles, designs and practical applications of the sensors.

Sensor technologies have experienced dramatic growth in recent years, making a significant impact on national security, healthcare, environmental improvement, energy management, food safety, construction monitoring, manufacturing and process control, and more. However, education on sensor technologies has not kept pace with this rapid development ... until now.

This book is a complete and compressive overview of sensing technologies. It contains six chapters beginning with sensors characteristics and terminology (Chapter 1), followed by resistive (Chapter 2), capacitive (Chapter 3), inductive (Chapter 4), and magnetic sensors (Chapter 5). Sensors signal characteristics, noise types, bridge and compensation circuits, passive/active filters and signal conditioning are also covered.

Resistive, Capacitive, Inductive, and Magnetic Sensor Technologies examines existing, new, and novel sensor technologies and – through real-world examples, sample problems, and practical exercises – illustrates how the related science and engineering principles can be applied across multiple disciplines, offering greater insight into various sensors' operating mechanisms and practical functions. The book assists readers in understanding resistive, capacitive, inductive, and magnetic (RCIM) sensors, as well as sensors with similar design concepts, characteristics, and circuitry.

The book provides cutting-edge information useful to students, researchers, scientists, and practicing professionals involved in the design and application of sensor-based products in fields such as biomedical engineering, mechatronics, robotics, aerospace, and beyond.

The book is interdisciplinary in nature and will be helpful in subject or courses such as sensors technologies and principles, applied physics, semiconductor materials and applications, engineering design, mechatronics, robotics, automatic control using sensors feedback, nondestructive inspection (NDI) technologies, analogue signal processing, sensor circuitry, and instrumentation and measurements.

This book is intended for advanced undergraduate and graduate-level engineering students. It would also be useful for professional engineers at all and scientists involved in sensor research and development.

22 Biomaterials: A Basic Introduction

by: Q. Chen and G. Thous

Published 2015

by CRC Press

**Taylor & Francis Group, 6000 Broken Sound Parkway NW,
Suite 300, Boca Raton, FL 33487-2742, 706 pp**

ISBN: 987-1-4322-2769-7 (alk. paper)

Biomaterials: A Basic Introduction is a definitive resource for students entering biomedical or bioengineering disciplines. This text offers a detailed exploration of engineering and materials science, and examines the boundary and relationship between the two. Based on the author's course lecture notes and many years of research, it presents students with the knowledge needed to select and design biomaterials used in medical devices. Placing special emphasis on metallic, ceramic, polymeric, and composite biomaterials, it explains the difference between materials science and materials engineering, introduces basic concepts and principles, and analyses the critically important properties of biomaterials.

Biomaterials is multidisciplinary subject that materials science, engineering, cell biology, and medicine. Covering all the aspects involved in these subject in a comprehensive and timely manner is often a daunting task; this textbook, however provides the reader with an appropriate balance between the depth and breadth of the topic covered. The book is equally simple and sufficient, enabling students to understand the most important biomaterials and bioengineering concepts and principles at various levels within the broad academic spectrum. This approach has been derived from authors many years of experience in a multidisciplinary research environment.

The crucial aspect of the book is its organic combination principles of materials science and medical sciences in a unique and comprehensive way that most biomaterial books have not achieved. Moreover, there are more general and closely related concepts and principles among materials science, engineering, and medical science; nonetheless, these are always considered separate disciplines and often describe using different terminologies. This textbook makes an introduction of the properties and principles of biomaterials from the perspective of clinical applications. In this sense, materials students can enjoy new information that has not been given in any of the traditional science course book; similarly, medical students are enabled to easily understand the concept and principles of materials science. Furthermore, the book covers aspects of biomedical science from a materials science. Furthermore, the book covers aspects of biomedical science from a materials point of view. This approach enables students majoring in materials science or engineering to equally understand the fundamentals of biometric materials' behaviour at their respective biological levels for any given application. Medical students also earn the privilege of obtaining fresh information that is seldom found in any traditional medical program.

The textbook has been organised into three parts. Part I discusses biomaterials, Part II medical science and Part III discusses evaluation and regulation of medical devices. Part I commences with an overview on engineering and materials science, then proceeds to focus on the definitions of biomaterials and biocompatibility, concluding with a summary of these subject. Subsequently, Chapters 4–11 provide specific emphasis on metallic, ceramic, polymeric and composite biomaterials. Part II begins with an overview of medical science vis-a-vis materials science (Chapter 12).

Chapters 13–18 describe anatomy, histology, and cell biology, respectively. The objective of these chapters, therefore, is to highlight health issue and diseases where biomaterials can easily find medical applications. The interactions between the biomaterials and the living body constitute the last chapter (Chapter 19) of Part II. In Part III the penultimate chapter of the book, Chapter 20, evaluates medical devices while the final chapter, Chapter 21, looks into their respective regulations.