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Optimization Concepts and Applications in Engineering *Metabolic Engineering* **Materials for Engineering** *Materials Science and Engineering: Concepts and Applications* Systems Engineering Concepts, Applications and Emerging Opportunities in Industrial Engineering **Materials Science and Engineering: Concepts, Methodologies, Tools, and Applications** **Software Engineering** *Industrial Engineering Reliability Engineering* **Empirical Research in Software Engineering** *Fundamentals of Antennas* Engineering Information Security **Electrical Engineering: Concepts and Applications** **Biomedical Engineering: Concepts, Methodologies, Tools, and Applications** **Efficient Learning Machines** *Difficult Engineering Concepts Better Explained: Statics and Dynamics* Computer Systems and Software Engineering: Concepts, Methodologies, Tools, and Applications System Dynamics for Engineering Students Civil and Environmental Engineering Fuzzy-reliability Engineering **Fundamental Mass Transfer Concepts in Engineering Applications** Industrial Engineering Materials Science and Engineering **Engineering Design and Mathematical Modelling** **Value Engineering** **Interdisciplinary Engineering Sciences** *Soil Mechanics* *Computer Engineering: Concepts, Methodologies, Tools and Applications* Industrial Engineering *Materials Science and Engineering* Concepts, Applications and Emerging Opportunities in Industrial Engineering Industrial Engineering: Concepts, Methodologies, Tools, and Applications Computer Systems and Software Engineering **Optimization for Chemical and Biochemical Engineering** **Semantic Technologies for Business and Information Systems Engineering** **Computer Systems and Software Engineering** **Mathematical Concepts and Applications in Mechanical Engineering and Mechatronics** **Biomedical Engineering** **Food Engineering: Concepts and Applications**

Reliability Engineering Jan 18 2022 This book gives a practical guide for designers and users in Information and Communication Technology context. In particular, in the first Section, the definition of the fundamental terms according to the

international standards are given. Then, some theoretical concepts and reliability models are presented in Chapters 2 and 3: the aim is to evaluate performance for components and systems and reliability growth. Chapter 4, by introducing the laboratory tests, puts in evidence the reliability concept from the experimental point of view. In ICT context, the failure rate for a given system can be evaluate by means of specific reliability prediction handbooks; this aspect is considered in Chapter 5, with practical applications. In Chapters 6, 7 and 8, the more complex aspects regarding both the Maintainability, Availability and Dependability are taken into account; in particular, some fundamental techniques such as FMECA (Failure Mode, Effects, and Criticality Analysis) and FTA (Fault Tree Analysis) are presented with examples for reparable systems.

Civil and Environmental Engineering Mar 08 2021 Civil and environmental engineers work together to develop, build, and maintain the man-made and natural environments that make up the infrastructures and ecosystems in which we live and thrive. Civil and Environmental Engineering: Concepts, Methodologies, Tools, and Applications is a comprehensive multi-volume publication showcasing the best research on topics pertaining to road design, building maintenance and construction, transportation, earthquake engineering, waste and pollution management, and water resources management and engineering. Through its broad and extensive coverage on a variety of crucial concepts in the field of civil engineering, and its subfield of environmental engineering, this multi-volume work is an essential addition to the library collections of academic and government institutions and appropriately meets the research needs of engineers, environmental specialists, researchers, and graduate-level students.

Software Engineering Mar 20 2022 Software Engineering: Concepts and Applications is designed to be a readable, practical guide for software engineering students as well as practitioners who are learning software engineering as they practice it. The book presents critical insights and techniques every student heading into the software engineering job market needs to know, and many seasoned software engineers must grasp to be better at their jobs. The subject matter of each chapter is strongly motivated and has clear take-aways that a student is bound to remember and apply. A continuous case study and chapter specific exercises illustrate how each idea relates to the bigger picture and how they can be applied in practice. Common pitfalls and workarounds have also been highlighted. This book presents software engineering not as an amalgamation of dry facts, but as a living and vibrant vocation with great growth potential in the near future. It is endowed with the results and insights from the author's own research, teaching, and industry experience which will help students easily understand the concepts and skills that are so vital in the real world of software development.

Interdisciplinary Engineering Sciences Aug 01 2020 Interdisciplinary Engineering Sciences introduces and emphasizes the importance of the interdisciplinary nature of education and research from a materials science perspective. This approach is

aimed to promote understanding of the physical, chemical, biological and engineering aspects of any materials science problem. Contents are prepared to maintain the strong background of fundamental engineering disciplines while integrating them with the disciplines of natural science. It presents key concepts and includes case studies on biomedical materials and renewable energy. Aimed at senior undergraduate and graduate students in materials science and other streams of engineering, this book Explores interdisciplinary research aspects in a coherent manner for materials science researchers Presents key concepts of engineering sciences as relevant for materials science in terms of fundamentals and applications Discusses engineering mechanics, biological and physical sciences Includes relevant case studies and examples

Computer Systems and Software Engineering Dec 25 2019

Computer Engineering: Concepts, Methodologies, Tools and Applications May 30 2020 "This reference is a broad, multi-volume collection of the best recent works published under the umbrella of computer engineering, including perspectives on the fundamental aspects, tools and technologies, methods and design, applications, managerial impact, social/behavioral perspectives, critical issues, and emerging trends in the field"--Provided by publisher.

Computer Systems and Software Engineering: Concepts, Methodologies, Tools, and Applications May 10 2021 Professionals in the interdisciplinary field of computer science focus on the design, operation, and maintenance of computational systems and software. Methodologies and tools of engineering are utilized alongside computer applications to develop efficient and precise information databases. Computer Systems and Software Engineering: Concepts, Methodologies, Tools, and Applications is a comprehensive reference source for the latest scholarly material on trends, techniques, and uses of various technology applications and examines the benefits and challenges of these computational developments. Highlighting a range of pertinent topics such as utility computing, computer security, and information systems applications, this multi-volume book is ideally designed for academicians, researchers, students, web designers, software developers, and practitioners interested in computer systems and software engineering.

Value Engineering Sep 02 2020

Concepts, Applications and Emerging Opportunities in Industrial Engineering May 22 2022

Fundamental Mass Transfer Concepts in Engineering Applications Jan 06 2021 Fundamental Mass Transfer Concepts in Engineering Applications provides the basic principles of mass transfer to upper undergraduate and graduate students from different disciplines. This book outlines foundational material and equips students with sufficient mathematical skills to tackle various engineering problems with confidence. It covers mass transfer in both binary and multicomponent systems and integrates the use of Mathcad® for solving problems. This textbook is an ideal resource for a one-semester course. Key Features

The concepts are explained with the utmost clarity in simple and elegant language Presents theory followed by a variety of practical, fully-worked example problems Includes a summary of the mathematics necessary for mass transfer calculations in an appendix Provides ancillary Mathcad® subroutines Includes end-of-chapter problems and a solutions manual for adopting instructors

Mathematical Concepts and Applications in Mechanical Engineering and Mechatronics Aug 21 2019 The application of mathematical concepts has proven to be beneficial within a number of different industries. In particular, these concepts have created significant developments in the engineering field. *Mathematical Concepts and Applications in Mechanical Engineering and Mechatronics* is an authoritative reference source for the latest scholarly research on the use of applied mathematics to enhance the current trends and productivity in mechanical engineering. Highlighting theoretical foundations, real-world cases, and future directions, this book is ideally designed for researchers, practitioners, professionals, and students of mechatronics and mechanical engineering.

Materials Science and Engineering: Concepts and Applications Jul 24 2022 The design and discovery of new materials falls under the domain of materials science and engineering. It primarily focuses on solids. It studies the factors which influence the structure, properties and performance of materials. The study of the relationship between the properties, structure and processing of materials is known as materials paradigm. The fields of nanotechnology, metallurgy and biomaterials have advanced with the understanding of this paradigm. The major categories of materials studied under this field include semiconductors, polymers, biomaterials, metals, nanomaterials and ceramics. The common methods of materials processing include welding, crystal growth, casting, sintering, glassblowing, etc. This book is a valuable compilation of topics, ranging from the basic to the most complex advancements in the field of materials science and engineering. There has been rapid progress in this field and its applications are finding their way across multiple industries. In this book, using case studies and examples, constant effort has been made to make the understanding of the difficult concepts of materials science as easy and informative as possible, for the readers.

Fuzzy-reliability Engineering Feb 07 2021 Fuzzy-reliability is a novel concept in systems engineering as fuzzy sets can capture subjective, uncertain and ambiguous information. This text focuses on fuzzy set based concepts and its applications. Various concepts such as probist, profust, fuzzy event based method, fuzzy fault tree analysis, transformations and hybrid approaches have been described. Applications in systems reliability, availability and maintainability, software reliability and power system reliability have been discussed in depth. Maintenance issues described in this text relate to fuzzy availability modeling for Markov and semi-Markov models, fuzzy dynamic reliability evaluation under imperfect repair and maintenance strategy

selection using fuzzy linguistics. Software reliability using fuzzification of cost model parameters like penalty, warranty and risks are applied to the existing growth models. Composite power system reliability modeling using fuzzy sets and fuzzy confidence intervals with fuzzy linear programming for minimization of load curtailment has demonstrated the flexibility and capability of using fuzzy sets in reliability engineering. This book is one of the few on the subject of fuzzy-reliability engineering.

Engineering Design and Mathematical Modelling Oct 03 2020 Engineering Design and Mathematical Modelling: Concepts and Applications consists of chapters that span the Engineering design and mathematical modelling domains. Engineering design and mathematical modelling are key tools/techniques in the Science, Technology and Innovation spheres. Whilst engineering design is concerned with the creation of functional innovative products and processes, mathematical modelling seeks to utilize mathematical principles and concepts to describe and control real world phenomena. Both of these can be useful tools for spurring and hastening progress in developing countries. They are also areas where Africa needs to 'skill-up' in order to build a technological base. The chapters in this book cover the relevant research trends in the fields of both engineering design and mathematical modelling. This book was originally published as a special issue of the African Journal of Science, Technology, Innovation and Development.

Empirical Research in Software Engineering Dec 17 2021 Empirical research has now become an essential component of software engineering yet software practitioners and researchers often lack an understanding of how the empirical procedures and practices are applied in the field. Empirical Research in Software Engineering: Concepts, Analysis, and Applications shows how to implement empirical research processes, procedures, and practices in software engineering. Written by a leading researcher in empirical software engineering, the book describes the necessary steps to perform replicated and empirical research. It explains how to plan and design experiments, conduct systematic reviews and case studies, and analyze the results produced by the empirical studies. The book balances empirical research concepts with exercises, examples, and real-life case studies, making it suitable for a course on empirical software engineering. The author discusses the process of developing predictive models, such as defect prediction and change prediction, on data collected from source code repositories. She also covers the application of machine learning techniques in empirical software engineering, includes guidelines for publishing and reporting results, and presents popular software tools for carrying out empirical studies.

System Dynamics for Engineering Students Apr 09 2021 Engineering system dynamics focuses on deriving mathematical models based on simplified physical representations of actual systems, such as mechanical, electrical, fluid, or thermal, and on solving these models for analysis or design purposes. System Dynamics for Engineering Students: Concepts and Applications

features a classical approach to system dynamics and is designed to be utilized as a one-semester system dynamics text for upper-level undergraduate students with emphasis on mechanical, aerospace, or electrical engineering. It is the first system dynamics textbook to include examples from compliant (flexible) mechanisms and micro/nano electromechanical systems (MEMS/NEMS). This new second edition has been updated to provide more balance between analytical and computational approaches; introduces additional in-text coverage of Controls; and includes numerous fully solved examples and exercises. Features a more balanced treatment of mechanical, electrical, fluid, and thermal systems than other texts Introduces examples from compliant (flexible) mechanisms and MEMS/NEMS Includes a chapter on coupled-field systems Incorporates MATLAB® and Simulink® computational software tools throughout the book Supplements the text with extensive instructor support available online: instructor's solution manual, image bank, and PowerPoint lecture slides NEW FOR THE SECOND EDITION Provides more balance between analytical and computational approaches, including integration of Lagrangian equations as another modelling technique of dynamic systems Includes additional in-text coverage of Controls, to meet the needs of schools that cover both controls and system dynamics in the course Features a broader range of applications, including additional applications in pneumatic and hydraulic systems, and new applications in aerospace, automotive, and bioengineering systems, making the book even more appealing to mechanical engineers Updates include new and revised examples and end-of-chapter exercises with a wider variety of engineering applications

Materials Science and Engineering Mar 28 2020

Industrial Engineering Apr 28 2020 "This book serves as a vital compendium of research, detailing the latest research, theories, and case studies on industrial engineering"--Provided by publisher

Efficient Learning Machines Jul 12 2021 Machine learning techniques provide cost-effective alternatives to traditional methods for extracting underlying relationships between information and data and for predicting future events by processing existing information to train models. *Efficient Learning Machines* explores the major topics of machine learning, including knowledge discovery, classifications, genetic algorithms, neural networking, kernel methods, and biologically-inspired techniques. Mariette Awad and Rahul Khanna's synthetic approach weaves together the theoretical exposition, design principles, and practical applications of efficient machine learning. Their experiential emphasis, expressed in their close analysis of sample algorithms throughout the book, aims to equip engineers, students of engineering, and system designers to design and create new and more efficient machine learning systems. Readers of *Efficient Learning Machines* will learn how to recognize and analyze the problems that machine learning technology can solve for them, how to implement and deploy standard solutions to sample problems, and how to design new systems and solutions. Advances in computing performance, storage, memory,

unstructured information retrieval, and cloud computing have coevolved with a new generation of machine learning paradigms and big data analytics, which the authors present in the conceptual context of their traditional precursors. Awad and Khanna explore current developments in the deep learning techniques of deep neural networks, hierarchical temporal memory, and cortical algorithms. Nature suggests sophisticated learning techniques that deploy simple rules to generate highly intelligent and organized behaviors with adaptive, evolutionary, and distributed properties. The authors examine the most popular biologically-inspired algorithms, together with a sample application to distributed datacenter management. They also discuss machine learning techniques for addressing problems of multi-objective optimization in which solutions in real-world systems are constrained and evaluated based on how well they perform with respect to multiple objectives in aggregate. Two chapters on support vector machines and their extensions focus on recent improvements to the classification and regression techniques at the core of machine learning.

Systems Engineering Jun 23 2022 This book discusses the concepts, tools and applications of systems engineering. Chapter One presents the implementation of automated measuring system for measuring chromatic dispersion (CD). Chapter Two discusses the results regarding the optimisation of phase based EOM (electro optical modulator) as the most important component in CD measurement setup, then investigates the results of CD measurement characterisations based on different lengths of fiber, different wavelengths and different RF frequencies. Chapter Three provides a review on optical waveguide sensor using ion-exchange technology. Chapter Four examines silver nano particle ion-exchanged glass waveguide technology. Chapter Five highlights the major advantages of using graphical modelling languages in a Model-Based Systems Engineering (MBSE) context and describes the main features of SysML, the modeling language that the authors believe to be the dialect for MBSE. Chapter Six provides a complex system analysis for engineering of systemic failures.

Soil Mechanics Jun 30 2020 A logical, integrated and comprehensive coverage of both introductory and advanced topics in soil mechanics in an easy-to-understand style. Emphasis is placed on presenting fundamental behaviour before more advanced topics are introduced. The use of S.I. units throughout, and frequent references to current international codes of practice and refereed research papers, make the contents universally applicable. Written with the university student in mind and packed full of pedagogical features, this book provides an integrated and comprehensive coverage of both introductory and advanced topics in soil mechanics. It includes: worked examples to elucidate the technical content and facilitate self-learning a convenient structure (the book is divided into sections), enabling it to be used throughout second, third and fourth year undergraduate courses universally applicable contents through the use of SI units throughout, frequent references to current international codes of practice and refereed research papers new and advanced topics that extend beyond those in standard undergraduate courses. The

perfect textbook for a range of courses on soils mechanics and also a very valuable resource for practising professional engineers.

Electrical Engineering: Concepts and Applications Sep 14 2021 For non-electrical engineering majors taking the introduction to electrical engineering course. Electrical Engineering: Concepts and Applications is the result of a multi-disciplinary effort at Michigan Technological University to create a new curriculum that is attractive, motivational, and relevant to students by creating many application-based problems; and provide the optimal level of both range and depth of coverage of EE topics in a curriculum package.

Materials for Engineering Aug 25 2022 Intended for an introductory course in materials science or metallurgy for all engineering students, this text provides complete coverage of the subject. The emphasis is on basic concepts of structure/property/performance relations and on applications to a wide variety of engineering fields.

Food Engineering: Concepts and Applications Jun 18 2019 Food engineering studies the nature of food and processes related to the production of food. It helps in the development of new processed food products and new techniques of manufacturing these products. Some of the disciplines related to this subject are food technology, food preservation, food microbiology, food chemistry, etc. This book outlines the processes and applications of food science in detail. It is a vital tool for all those who are researching or studying food engineering as it gives incredible insights into emerging trends and concepts.

Biomedical Engineering: Concepts, Methodologies, Tools, and Applications Aug 13 2021 Technological tools and computational techniques have enhanced the healthcare industry. These advancements have led to significant progress and novel opportunities for biomedical engineering. Biomedical Engineering: Concepts, Methodologies, Tools, and Applications is an authoritative reference source for emerging scholarly research on trends, techniques, and future directions in the field of biomedical engineering technologies. Highlighting a comprehensive range of topics such as nanotechnology, biomaterials, and robotics, this multi-volume book is ideally designed for medical practitioners, professionals, students, engineers, and researchers interested in the latest developments in biomedical technology.

Materials Science and Engineering Nov 04 2020

Fundamentals of Antennas Nov 16 2021 Annotation This tutorial explains antenna theory and operation and is intended for students, engineers, and researchers. Basic wire antennas and array antennas are described in detail and other types are introduced, including reflectors, lenses, horns, microstrip, Yagi, and frequency-independent antennas.

Industrial Engineering: Concepts, Methodologies, Tools, and Applications Jan 26 2020 Industrial engineering affects all levels of society, with innovations in manufacturing and other forms of engineering oftentimes spawning cultural or educational shifts

along with new technologies. *Industrial Engineering: Concepts, Methodologies, Tools, and Applications* serves as a vital compendium of research, detailing the latest research, theories, and case studies on industrial engineering. Bringing together contributions from authors around the world, this three-volume collection represents the most sophisticated research and developments from the field of industrial engineering and will prove a valuable resource for researchers, academics, and practitioners alike.

Concepts, Applications and Emerging Opportunities in Industrial Engineering Feb 25 2020 From their initial focus in manufacturing, the industrial engineering principles, tools, and techniques have spread across a spectrum of application areas. Topics covered in this book apply to this continuum of application, including operations planning, safety, quality, production control, inventory management, operations research, supply chain management, and continuous improvement. This edited book comes at an opportune time. It incorporates new knowledge and expertise in a rapidly changing engineering discipline that is a vital force in a wide range of manufacturing, service, educational, and government organizations. Such concepts as lean systems, sustainability, systems thinking, data analytics, and additive manufacturing, as well as utilization of advanced computer software, have further expanded industrial engineering's breadth. Each chapter reflects important aspects of these advances.

Industrial Engineering Feb 19 2022 "This book serves as a vital compendium of research, detailing the latest research, theories, and case studies on industrial engineering"--Provided by publisher.

Optimization for Chemical and Biochemical Engineering Nov 23 2019 "Optimization for Chemical and Biochemical Engineering - Theory, Algorithms, Modeling and Applications"--

Semantic Technologies for Business and Information Systems Engineering Oct 23 2019 "This book investigates the application of semantic technologies to business and information systems engineering"--Provided by publisher.

Materials Science and Engineering: Concepts, Methodologies, Tools, and Applications Apr 21 2022 The design and study of materials is a pivotal component to new discoveries in the various fields of science and technology. By better understanding the components and structures of materials, researchers can increase its applications across different industries. *Materials Science and Engineering: Concepts, Methodologies, Tools, and Applications* is a compendium of the latest academic material on investigations, technologies, and techniques pertaining to analyzing the synthesis and design of new materials. Through its broad and extensive coverage on a variety of crucial topics, such as nanomaterials, biomaterials, and relevant computational methods, this multi-volume work is an essential reference source for engineers, academics, researchers, students, professionals, and practitioners seeking innovative perspectives in the field of materials science and engineering.

Metabolic Engineering Sep 26 2022 Learn more about foundational and advanced topics in metabolic engineering in this

comprehensive resource edited by leaders in the field *Metabolic Engineering: Concepts and Applications* delivers a one-stop resource for readers seeking a complete description of the concepts, models, and applications of metabolic engineering. This guide offers practical insights into the metabolic engineering of major cell lines, including *E. Coli*, *Bacillus* and *Yarrowia Lipolytica*, and organisms, including human, animal, and plant). The distinguished editors also offer readers resources on microbiome engineering and the use of metabolic engineering in bioremediation. Written in two parts, *Metabolic Engineering* begins with the essential models and strategies of the field, like Flux Balance Analysis, Quantitative Flux Analysis, and Proteome Constrained Models. It also provides an overview of topics like Pathway Design, Metabolomics, and Genome Editing of Bacteria and Eukarya. The second part contains insightful descriptions of the practical applications of metabolic engineering, including specific examples that shed light on the topics within. In addition to subjects like the metabolic engineering of animals, humans, and plants, you'll learn more about: Metabolic engineering concepts and a historical perspective on their development The different modes of analysis, including flux balance analysis and quantitative flux analysis An illuminating and complete discussion of the thermodynamics of metabolic pathways The Genome architecture of *E. coli*, as well as genome editing of both bacteria and eukarya An in-depth treatment of the application of metabolic engineering techniques to organisms including corynebacterial, bacillus, and pseudomonas, and more Perfect for students of biotechnology, bioengineers, and biotechnologists, *Metabolic Engineering: Concepts and Applications* also has a place on the bookshelves of research institutes, biotechnological institutes and industry labs, and university libraries. It's comprehensive treatment of all relevant metabolic engineering concepts, models, and applications will be of use to practicing biotechnologists and bioengineers who wish to solidify their understanding of the field.

Engineering Information Security Oct 15 2021 *Engineering Information Security* covers all aspects of information security using a systematic engineering approach and focuses on the viewpoint of how to control access to information. Includes a discussion about protecting storage of private keys, SCADA, Cloud, Sensor, and Ad Hoc networks Covers internal operations security processes of monitors, review exceptions, and plan remediation Over 15 new sections Instructor resources such as lecture slides, assignments, quizzes, and a set of questions organized as a final exam If you are an instructor and adopted this book for your course, please email ieeeproposals@wiley.com to get access to the additional instructor materials for this book.

Biomedical Engineering Jul 20 2019

Optimization Concepts and Applications in Engineering Oct 27 2022 In this revised and enhanced second edition of *Optimization Concepts and Applications in Engineering*, the already robust pedagogy has been enhanced with more detailed explanations, an increased number of solved examples and end-of-chapter problems. The source codes are now available free on

multiple platforms. It is vitally important to meet or exceed previous quality and reliability standards while at the same time reducing resource consumption. This textbook addresses this critical imperative integrating theory, modeling, the development of numerical methods, and problem solving, thus preparing the student to apply optimization to real-world problems. This text covers a broad variety of optimization problems using: unconstrained, constrained, gradient, and non-gradient techniques; duality concepts; multiobjective optimization; linear, integer, geometric, and dynamic programming with applications; and finite element-based optimization. It is ideal for advanced undergraduate or graduate courses and for practising engineers in all engineering disciplines, as well as in applied mathematics.

Industrial Engineering Dec 05 2020 "This book serves as a vital compendium of research, detailing the latest research, theories, and case studies on industrial engineering"--

Computer Systems and Software Engineering Sep 21 2019

Difficult Engineering Concepts Better Explained: Statics and Dynamics Jun 11 2021 Engineering statics discusses proper ways of conducting force analysis. This unique compendium treats fundamental force analysis in a systematic and comprehensive manner. The indispensable volume is suitable for undergraduate students to learn the subject in greater depth, for graduate students to review essential skills in force analysis correctly, and for practicing engineers to review and refresh key concepts. This useful reference text also presented numerous application examples for readers in solving daily practical problems.