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Engineering Applications in Sustainable Design and Development Sustainable Energy System Engineering Conflict Resolution in Water Resources and Environmental Management Transforming Sustainability Strategy into Action System Engineering Analysis, Design, and Development Using the Engineering Literature, Second Edition International MindTap Engineering Instant Access Sustainable Transportation Systems Engineering Handbook of Research on Pedagogical Innovations for Sustainable Development Biomass, Biofuels, Biochemicals Life Cycle Assessment on Green Building Implementation Systems Engineering and Analysis Sustainable Fashion Supply Chain Management Towards Sustainable Chemical Processes Sustainable Engineering Whole System Design Managing Water Resources: Applied systems analysis. General systems theory Green Design and Manufacturing for Sustainability Sustainable Engineering Industrial Environmental Management Encyclopedia of Sustainable Technologies Smart and Sustainable Engineering for Next Generation Applications Feasibility Analysis for Sustainable Technologies Environmental Systems - Volume II Engineering for Sustainability Sustainable Engineering Systems Analysis for Sustainable Engineering: Theory and Applications Sustainable Environmental Engineering Sustainable Engineering Solid Waste Management MECHANICAL ENGINEERING, ENERGY SYSTEMS AND SUSTAINABLE DEVELOPMENT - Volume IV Sustainability in the Design, Synthesis and Analysis of Chemical Engineering Processes Green Sustainable Process for Chemical and Environmental Engineering and Science Sustainable Solid Waste Management Assessing and Measuring Environmental Impact and Sustainability Systems Analysis for Sustainable Engineering: Theory and Applications Computational Intelligent Data Analysis for Sustainable Development Engineering for Sustainability Environmental Remote Sensing and Systems Analysis Transition Engineering

Engineering Applications in Sustainable Design and Development

Using a systems analysis approach and extensive case studies, *Environmental Remote Sensing and Systems Analysis* shows how remote sensing can be used to support environmental decision making. It presents a multidisciplinary framework and the latest remote sensing tools to understand environmental impacts, management complexity, and policy implications

Sustainable Energy System Engineering

Sustainability and sustainable development have become popular goals. They have also become wide-ranging terms that can be applied to any entity or enterprise on a local or a global scale for long time periods. As enterprises and systems become more complex and development a support cost increase, the question remains: how does one engineer an enterprise or a product for sustainability? Engineering for Sustainability provides common sense information for engineering, planning, and carrying out those tasks needed to sustain military products and services and, in turn, the entire enterprise. This book tackles the problem from the top down, beginning with discussions on planning initiatives and implementing sustainable activities. It outlines a series of principles to help engineers design products and services to meet customer and societal needs with minimal impact on resources and the ecosystem. Using examples and case studies from the government, military, academia, and commercial enterprises, the authors provide a set of tools for long-term sustainability and explain how an entire enterprise can be engineered to sustain itself. Achieving the high levels of sustainability needed in complex military and industrial systems is too often an elusive goal. Competing rules and regulations, conflicting goals and performance metrics, the desire to incorporate promising commercial off-the-shelf technologies, and the pressures of maintenance schedules contribute to this elusiveness. This book provides an analysis of and prescription for the strategies, principles, and technologies necessary to sustain the military and the systems it develops and uses. This can then be used to make any enterprise more efficient and cost effective in a changing environment.

Conflict Resolution in Water Resources and Environmental Management

Provides aspiring engineers with pertinent information and technological methodologies on how best to manage industry's modern-day environment concerns This book explains why industrial environmental management is important to human environmental interactions and describes what the physical, economic, social, and technological constraints to achieving the goal of a sustainable environment are. It emphasizes recent progress in life-cycle sustainable design, applying green engineering principles and the concept of Zero Effect Zero Defect to minimize wastes and discharges from various manufacturing facilities. Its goal is to educate engineers on how to obtain an optimum balance between environmental protections, while allowing humans to maintain an acceptable quality of life. Industrial Environmental Management: Engineering, Science, and Policy covers topics such as industrial wastes, life cycle sustainable design, lean manufacturing, international environmental regulations, and the assessment and management of health and environmental risks. The book also looks at the economics of manufacturing pollution prevention; how eco-industrial parks and process intensification will help minimize waste; and the application of green manufacturing principles in order to minimize wastes and discharges from manufacturing facilities. Provides end-of-chapter questions along with a solutions manual for adopting professors Covers a wide range of interdisciplinary areas that makes it suitable for different branches of engineering such as wastewater management and treatment; pollutant sampling; health risk assessment; waste minimization; lean manufacturing; and regulatory information Shows how industrial environmental management is connected to areas like sustainable engineering, sustainable manufacturing, social policy, and more Contains theory, applications, and real-world problems along with their solutions Details waste recovery systems Industrial Environmental Management: Engineering, Science, and Policy is an ideal textbook for junior and senior level students in multidisciplinary engineering fields such as chemical, civil, environmental, and petroleum engineering. It will appeal to practicing engineers seeking information about sustainable design principles and methodology.

Transforming Sustainability Strategy into Action

Transition Engineering: Building a Sustainable Future examines new strategies emerging in response to the mega-issues of global climate change, decline in world oil supply, scarcity of key industrial minerals, and local environmental constraints. These issues pose challenges for organizations, businesses, and communities, and engineers will need to begin developing ideas and projects to implement the transition of engineered systems. This work presents a methodology for shifting away from unsustainable activities. Teaching the Transition Engineering approach and methodology is the focus of the text, and the concept is presented in a way that engineers can begin applying it in their work.

System Engineering Analysis, Design, and Development

IMPLEMENT SYSTEMS ANALYSIS TOOLS IN SUSTAINABLE ENGINEERING Featuring a multidisciplinary approach, *Systems Analysis for Sustainable Engineering: Theory and Applications* provides a proven framework for applying systems analysis tools to account for environmental impacts, energy efficiency, cost-effectiveness, socioeconomic implications, and ecosystem health in engineering solutions. This pioneering work addresses the increased levels of sophistication embedded in many complex large-scale infrastructure systems and their interactions with the natural environment. After a detailed overview of sustainable systems engineering, the book covers mathematical theories of systems analysis, environmental resources management, industrial ecology, and sustainable design. Real-world examples highlight the methodologies presented in this authoritative resource. COVERAGE INCLUDES: Structured systems analysis for sustainable design Systems analysis and sustainable management strategies Economic valuation, instruments, and project selection Statistical forecasting models Linear, nonlinear, integer, and dynamic programming models Multicriteria decision analyses System dynamics models and simulation analyses Water resources and quality management Air quality management Solid waste management Soil and groundwater remediation planning Industrial ecology and sustainability Green building and green infrastructure systems Energy resources management and energy systems engineering Land resources management and agricultural sustainability

Using the Engineering Literature, Second Edition

Praise for the first edition: "This excellent text will be useful to every system engineer (SE) regardless of the domain. It covers ALL relevant SE material and does so in a very clear, methodical fashion. The breadth and depth of the author's presentation of SE principles and practices is outstanding." -Philip Allen This textbook presents a comprehensive, step-by-step guide to System Engineering analysis, design, and development via an integrated set of concepts, principles, practices, and methodologies. The methods presented in this text apply to any type of human system - small, medium, and large organizational systems and system development projects delivering engineered systems overseas across multiple business sectors such as medical, transportation, financial, educational, governmental, aerospace and defense, utilities, political, and charity, among others. Provides a common focal point for "bridging the gap" between and unifying System Users, System Acquirers, multi-discipline System Engineering, and Project, Functional, and Executive Management education, knowledge, and decision-making for developing systems, products, or services Each chapter provides definitions of key terms, guiding principles, examples, author's notes, real-world examples, and exercises, which highlight and reinforce key SE&D concepts and practices Addresses concepts employed in Model-Based Systems Engineering (MBSE), Model-Driven Design (MDD), Unified Modeling Language (UML) / Systems Modeling Language (SysML), and Agile/Spiral/V-Model Validation such as user needs, stories, and use cases analysis; specification/development; system architecture development; User-Centric System Design (UCSD); interface definition & control; system integration & test; and Verification & Validation (V&V) Highlights/introduces a new 21st Century Systems Engineering & Development (SE&D) paradigm that is easy to understand and implement. Provides practices that are critical staging points for technical decision making such as Technical Strategy Development; Life Cycle requirements; Phases, Modes, & States; SE Process; Requirements Derivation; System Architecture Development, User-Centric System Design (UCSD); Engineering Standards, Coordinate Systems, and Conventions; et al. Thoroughly illustrated, with end-of-chapter exercises and numerous case studies and examples, *Systems Engineering Analysis, Design, and Development, Second Edition* is a primary textbook for multi-discipline, engineering, system analysis, and project management undergraduate/graduate level students and a valuable reference for professionals.

International MindTap Engineering Instant Access

This handbook is a compilation of comprehensive reference sources that provide state-of-the-art findings on both theoretical and applied research on sustainable fashion supply chain management. It contains three parts, organized under the headings of "Reviews and Discussions," "Analytical Research," and "Empirical Research," featuring peer-reviewed papers contributed by researchers from Asia, Europe, and the US. This book is the first to focus on sustainable supply chain management in the fashion industry and is therefore a pioneering text on this topic. In the fashion industry, disposable fashion under the fast fashion concept has become a trend. In this trend, fashion supply chains must be highly responsive to market changes and able to produce fashion products in very small quantities to satisfy changing consumer needs. As a result, new styles will appear in the market within a very short time and fashion brands such as Zara can reduce the whole process cycle from conceptual design to a final ready-to-sell "well-produced and packaged" product on the retail sales floor within a few weeks. From the supply chain's perspective, the fast fashion concept helps to match supply and demand and lowers inventory. Moreover, since many fast fashion companies, e.g., Zara, H&M, and Topshop, adopt a local sourcing approach and obtain supply from local manufacturers (to cut lead time), the corresponding carbon footprint is much reduced. Thus, this local sourcing scheme under fast fashion would enhance the level of environmental friendliness compared with the more traditional offshore sourcing. Furthermore, since the fashion supply chain is notorious for generating high volumes of pollutants, involving hazardous materials in the production processes, and producing products by companies with low social responsibility, new management principles and theories, especially those that take into account consumer behaviours and preferences, need to be developed to address many of these issues in order to achieve the goal of sustainable fashion supply chain management. The topics covered include Reverse Logistics of US Carpet Recycling; Green Brand Strategies in the Fashion Industry; Impacts of Social Media on Consumers' Disposal of Apparel; Fashion Supply Chain Network Competition with Eco-labelling; Reverse Logistics as a Sustainable Supply Chain Practice for the Fashion Industry; Apparel Manufacturers' Path to World-class Corporate Social Responsibility; Sustainable Supply Chain Management in the Slow-Fashion Industry; Mass Market Second-hand Clothing Retail Operations in Hong Kong; Constraints and Drivers of Growth in the Ethical Fashion Sector: The case of France; and Effects of Used Garment Collection Programmes in Fast Fashion Brands.

Sustainable Transportation Systems Engineering

ENGINEERING APPLICATIONS IN SUSTAINABLE DESIGN AND DEVELOPMENT is an invaluable resource for today's engineering student. Focusing on pressing contemporary issues, the text puts product design in the context of models of sustainability. Relevant case studies from across the globe will be of interest to engineers in training, and active learning exercises in each chapter help students learn to apply theory to real world situations. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Handbook of Research on Pedagogical Innovations for Sustainable Development

Preface -- 1. Introduction -- 2. Setting up a design assignment -- 3. Structuring the sustainability context -- 4. Creating design solutions -- 5. Acquiring sustainable design competences.

Biomass, Biofuels, Biochemicals

Towards Sustainable Chemical Processes describes a comprehensive framework for sustainability assessment, design and the processes optimization of chemical engineering. Beginning with the analysis and assessment in the early stage of chemical products' initiating, this book focuses on the combination of science sustainability and process system engineering, involving mathematical models, industrial ecology, circular economy, energy planning, process integration and sustainability engineering. All chapters throughout answered two fundamental questions in depth: (1) what tools and models are available to be used to assess and design sustainable chemical processes, (2) what the core theories and concepts are to get into the sustainable chemical process fields. Therefore, Towards Sustainable Chemical Processes is an indispensable guide for chemical engineers, researchers, students, practitioners and consultants in sustainability related area. Provides innovative, novel and comprehensive methods and models for sustainability assessment, design and optimization, and the synthesis and integration of chemical engineering processes Combines sustainability science with process system engineering Integrates mathematical models, industrial ecology, circular economy, energy planning, process integration and sustainability engineering Includes new case studies related to renewable energy, resource management, process synthesis and process integration

Life Cycle Assessment on Green Building Implementation

Written by an educator with close to 40 years of experience in developing and teaching design and manufacturing courses at the graduate and undergraduate levels, *Green Design and Manufacturing for Sustainability* integrates green design and manufacturing within the framework of sustainability, emphasizing cost, recyclables, and reuse. It includes th

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Systems Engineering and Analysis

Environmental Systems is a component of Encyclopedia of Environmental and Ecological Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty one Encyclopedias. Environmental Systems is something about data handling, modeling and decision making in the field of environmental systems. It includes related basic knowledge on measurement techniques, modeling techniques and models and their applications for decisions making. Environmental engineering / research are based on measurement techniques and related knowledge of natural and life sciences. Developed mathematical and numerical simulation models are tools and strictly purpose oriented, that means suitable for decision making. The three volumes on Environmental Systems are aimed at the following five major target audiences: University and College students Educators, Professional practitioners, Research personnel and Policy analysts, managers, and decision makers and NGOs.

Sustainable Fashion Supply Chain Management

Comprehensively covers the definition, methodology, and current applications of the principles of sustainability and resiliency in every engineering discipline This book contains detailed information about sustainability and resiliency principles and applications in engineering practice, and provides information on how to use scientific tools for sustainability assessment that help engineers select the best alternative for each project or activity. Logically organized around the three pillars of sustainability—environment, economy, and society—it is a primary resource for students and professionals alike. Sustainable Engineering: Drivers, Metrics, Tools, and Applications offers numerous ways to help engineers contribute towards global sustainable development while solving some of the grand challenges the world is facing today. The first part of the book covers the environmental, economic, and social impacts associated with project/product development as well as society as a whole. This is followed by a section devoted to sustainability metrics and assessment tools, which includes material flow analysis and material budget, carbon footprint analysis, life cycle assessment, environmental health risk assessment, and more. Next comes an in-depth examination of sustainable engineering practices, including sustainable energy engineering, sustainable waste management, and green and sustainable buildings. The book concludes with a look at how sustainable engineering may be applied to different engineering (i.e. environmental, chemical, civil, materials, infrastructure) projects. Some of the key features of this book include the following: Provides a complete and sensible understanding of the important concepts of sustainability, resiliency, and sustainable engineering Offers detailed explanations of sustainable engineering practices in waste management and remediation of contaminated sites, civil construction and infrastructure, and climate geoengineering Presents a set of case studies across different engineering disciplines such as bio/chemical, environmental, materials, construction, and infrastructure engineering that demonstrate the practical applicability of sustainability assessment tools to diverse projects Includes questions at the end of each chapter as well as a solutions manual for academic adopters The depth of coverage found in Sustainable Engineering: Drivers, Metrics, Tools, and Applications makes it an ideal textbook for graduate students across all engineering disciplines and a handy resource for active professionals.

Towards Sustainable Chemical Processes

"This book is about systems. It concentrates on the engineering of human-made systems and on systems analysis. In the first case, emphasis is on the process of bringing systems into being, beginning with the identification of a need and extending through requirements determination, functional analysis and allocation, design synthesis and evaluation, validation, operation and support, and disposal. In the second case, focus is on the improvement of systems already in being. By employing the iterative process of analysis, evaluation, modification, and feedback most systems now in existence can be improved in their effectiveness, product quality, affordability, and stakeholder satisfaction."--BOOK JACKET.

Sustainable Engineering

Sustainable Engineering: Principles and Implementation provides a comprehensive overview of the interdisciplinary field of sustainability as it applies to engineering and methods for implementation of sustainable practices. Due to increasing constraints on resources and on the environment and effects of climate change, engineers are being faced with new challenges. While it is generally believed that the concepts of sustainable design must be adhered to so that future generations may be protected, the execution and practice of these concepts are very difficult. It is therefore the focus of this book to give both a conceptual understanding as well as practical skills to apply sustainable engineering principles to engineering design. This book introduces relevant theory, principles, and ethical expectations for engineers, presents concepts related to industrial ecology, green engineering, and eco-design, and details frameworks that indicate the challenges and constraints of applying sustainable development principles. It describes the tools, protocols, and guidelines that are currently available through case studies and examples from around the world. The book is designed to be used by undergraduate and graduate students in any engineering program (with particular emphasis on civil, environmental and chemical engineering) and other programs in which sustainability is taught, in addition to practicing scientists and engineers and all others concerned with the sustainability of products, projects and processes. Specific Features: Discusses sources of contaminants and their impact on the environment Addresses sustainable assessment techniques, policies, protocols and guidelines Describes new tools and technologies for achieving sustainable engineering Includes social and economic sustainability dimensions Offers case studies demonstrating implementation of sustainable engineering practices

Whole System Design

Assessing Engineering Designs for Environmental, Economic, and Social Impact Engineers will play a central role in addressing one of the twenty-first century's key challenges: the development of new technologies that address societal needs and wants within the constraints imposed by limited natural resources and the need to protect environmental systems. To create tomorrow's sustainable products, engineers must carefully consider environmental, economic, and social factors in evaluating their designs. Fortunately, quantitative tools for incorporating sustainability concepts into engineering designs and performance metrics are now emerging. Sustainable Engineering introduces these tools and shows how to apply them. Building on widely accepted principles they first introduced in Green Engineering, David T. Allen and David R. Shonnard discuss key aspects of designing sustainable systems in any engineering discipline. Their powerful, unified approach integrates essential engineering and quantitative design skills, industry perspectives, and case studies, enabling engineering professionals, educators, and students to incorporate sustainability throughout their work. Coverage includes A concise review of the natural resource and environmental challenges engineers face when designing for sustainability Analysis and legislative frameworks for addressing environmental issues and sustainability Methods for identifying green and sustainable materials Principles for improving the sustainability of engineering designs Tools for evaluating sustainable designs and monetizing their benefits

Managing Water Resources: Applied systems analysis. General systems theory

Assessing and Measuring Environmental Impact and Sustainability answers the question "what are the available methodologies to assess the environmental sustainability of a product, system or process? Multiple well-known authors share their expertise in order to give a broad perspective of this issue from a chemical and environmental engineering perspective. This mathematical, quantitative book includes many case studies to assist with the practical application of environmental and sustainability methods. Readers learn how to efficiently assess and use these methods. This book summarizes all relevant environmental methodologies to assess the sustainability of a product and tools, in order to develop more green products or processes. With life cycle assessment as its main methodology, this book speaks to engineers interested in environmental impact and sustainability. Helps engineers to assess, evaluate, and measure sustainability in industry Provides workable approaches to environmental and sustainability assessment Readers learn tools to assess the sustainability of a process or product and to design it in an environmentally friendly way

Green Design and Manufacturing for Sustainability

ENGINEERING APPLICATIONS IN SUSTAINABLE DESIGN AND DEVELOPMENT is an invaluable resource for today's engineering student. Focusing on pressing contemporary issues, the text puts product design in the context of models of sustainability. Relevant case studies from across the globe will be of interest to engineers in training, and active learning exercises in each chapter help students learn to apply theory to real world situations. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Sustainable Engineering

Feasibility Analysis for Sustainable Technologies will lead you into a professional feasibility analysis for a renewable energy or energy efficiency project. The analysis begins with an understanding of the basic engineering description of technology in terms of capacity, efficiency, constraints, and dependability. It continues in modeling the cash flow of a project, which is affected by the installed cost, the revenues or expenses avoided by using the technology, the operating expenses of the technology, available tax credits and rebates, and laws regarding depreciation and income tax. The feasibility study is completed by discounted cash flow analysis, using an appropriate discount rate and a proper accounting for inflation, to evaluate the financial viability of the project. The elements of this analysis are illustrated using numerous examples of solar, wind and hydroelectric power, biogas digestion, energy storage, biofuels, and energy-efficient appliances and buildings.

Industrial Environmental Management

Water resources management is increasingly interdisciplinary and must take into account complex socioeconomic factors and environmental variables. This book describes the 'systems approach' and its application to contemporary water resources management, focusing on three main sets of tools: simulation, optimization and multi-objective analysis. This approach is presented within the context of sustainable planning and development under conditions of uncertainty. The publication introduces system dynamic simulation as a tool for integrated modeling and contains coverage of the use of fuzzy sets for incorporating objective and subjective uncertainties. It combines theory with many practical examples, as well as including programs and exercises on an accompanying CD-ROM. It composes both an advanced text for students of water resources and civil or environmental engineering and a practical guide for professionals.--Publisher's description.

Encyclopedia of Sustainable Technologies

The important resource that explores the twelve design principles of sustainable environmental engineering Sustainable Environmental Engineering (SEE) is to research, design, and build Environmental Engineering Infrastructure System (EELS) in harmony with nature using life cycle cost analysis and benefit analysis and life cycle assessment and to protect human health and environments at minimal cost. The foundations of the SEE are the twelve design principles (TDPs) with three specific rules for each principle. The TDPs attempt to transform how environmental engineering could be taught by prioritizing six design hierarchies through six different dimensions. Six design hierarchies are prevention, recovery, separation, treatment, remediation, and optimization. Six dimensions are integrated system, material economy, reliability on spatial scale, resiliency on temporal scale, and cost effectiveness. In addition, the authors, two experts in the field, introduce major computer packages that are useful to solve real environmental engineering design problems. The text presents how specific environmental engineering issues could be identified and prioritized under climate change through quantification of air, water, and soil quality indexes. For water pollution control, eight innovative technologies which are critical in the paradigm shift from the conventional environmental engineering design to water resource recovery facility (WRRF) are examined in detail. These new processes include UV disinfection, membrane separation technologies, Anammox, membrane biological reactor, struvite precipitation, Fenton process, photocatalytic oxidation of organic pollutants, as well as green infrastructure. Computer tools are provided to facilitate life cycle cost and benefit analysis of WRRF. This important resource: • Includes statistical analysis of engineering design parameters using Statistical Package for the Social Sciences (SPSS) • Presents Monte Carlo simulation using Crystal ball to quantify uncertainty and sensitivity of design parameters • Contains design methods of new energy, materials, processes, products, and system to achieve energy positive WRRF that are illustrated with Matlab • Provides information on life cycle costs in terms of capital and operation for different processes using MatLab Written for senior or graduates in environmental or chemical engineering, Sustainable Environmental Engineering defines and illustrates the TDPs of SEE. Undergraduate, graduate, and engineers should find the computer codes are useful in their EEIS design. The exercise at the end of each chapter encourages students to identify EEI engineering problems in their own city and find creative solutions by applying the TDPs. For more information, please visit www.tang.fiu.edu.

Smart and Sustainable Engineering for Next Generation Applications

Sustainability in the Design, Synthesis and Analysis of Chemical Engineering Processes is an edited collection of contributions from leaders in their field. It takes a holistic view of sustainability in chemical and process engineering design, and incorporates economic analysis and human dimensions. Ruiz-Mercado and Cabezas have brought to this book their experience of researching sustainable process design and life cycle sustainability evaluation to assist with development in government, industry and academia. This book takes a practical, step-by-step approach to designing sustainable plants and processes by starting from chemical engineering fundamentals. This method enables readers to achieve new process design approaches with high influence and less complexity. It will also help to incorporate sustainability at the early stages of project life, and build up multiple systems level perspectives. Ruiz-Mercado and Cabezas' book is the only book on the market that looks at process sustainability from a chemical engineering fundamentals perspective. Improve plants, processes and products with sustainability in mind; from conceptual design to life cycle assessment Avoid retro fitting costs by planning for sustainability concerns at the start of the design process Link sustainability to the chemical engineering fundamentals

Feasibility Analysis for Sustainable Technologies

Green Sustainable Process for Chemical and Environmental Engineering and Science: Solvents for the Pharmaceutical Industry aims at providing a detailed overview of applications of green solvents in pharmaceutical industries. It also focuses on providing a detailed literature survey on the green solvents for pharmaceutical analysis, drug design, synthesis, and production, etc. It summarizes the applications of various green solvents such as water, cyrene, vegetable oils, ionic liquids, ethyl lactate, eutectic solvents, and glycerol in contrast to toxic solvents. This book provides an overview of the use of green solvents for the sustainable and environmentally friendly development of synthetic methodologies for biomedical and pharmaceutical industries. Up-to-date developments towards the development of solvents for pharmaceutical industry Includes latest advances in pharmaceutical analysis and synthesis using green solvents Outlines eco-friendly green solvents for medicinal applications Slate-of-the-art overview on the exploration of green solvents for pharmaceutical industries

Environmental Systems - Volume II

The interactions between human activities and the environment are complicated and often difficult to quantify. In many occasions, judging where the optimal balance should lie among environmental protection, social well-being, economic growth, and technological progress is complex. The use of a systems engineering approach will fill in the gap contributing to how we understand the intricacy by a holistic way and how we generate better sustainable solid waste management practices. This book also aims to advance interdisciplinary understanding of intertwined facets between policy and technology relevant to solid waste management issues interrelated to climate change, land use, economic growth, environmental

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pollution, industrial ecology, and population dynamics.

Engineering for Sustainability

Engineer and implement sustainable transportation solutions Featuring in-depth coverage of passenger and freight transportation, this comprehensive resource discusses contemporary transportation systems and options for improving their sustainability. The book addresses vehicle and infrastructure design, economics, environmental concerns, energy security, and alternative energy sources and platforms. Worked-out examples, case studies, illustrations, equations, and end-of-chapter problems are also included in this practical guide. Sustainable Transportation Systems Engineering covers: Background on energy security and climate change Systems analysis tools and techniques Individual choices and transportation demand Transportation systems and vehicle design Physical design of transportation infrastructure Congestion mitigation in urban passenger transportation Role of intelligent transportation systems Public transportation and multimodal solutions Personal mobility and accessibility Intercity passenger transportation Freight transportation function and current trends Freight modal and supply chain management approaches Spatial and geographic aspects of freight transportation Alternative fuels and platforms Electricity and hydrogen as alternative fuels Bioenergy resources and systems Transportation security and planning for extreme weather events PRAISE FOR SUSTAINABLE TRANSPORTATION SYSTEMS ENGINEERING: "This book addresses one of the great challenges of the 21st century—how to transform our resource-intensive passenger and freight transportation system into a set of low-carbon, economically efficient, and socially equitable set of services." -- Dan Sperling, Professor and Director, Institute of Transportation Studies, University of California, Davis, author of Two Billion Cars: Driving toward Sustainability "provides a rich tool kit for students of sustainable transportation, embracing a systems approach. The authors aptly blend engineering, economics, and environmental impact analysis approaches." -- Susan Shaheen, Professor, Department of Civil and Environmental Engineering, and Co-Director, Transportation Sustainability Research Center, University of California, Berkeley

Sustainable Engineering

Encyclopedia of Sustainable Technologies provides an authoritative assessment of the sustainable technologies that are currently available or in development. Sustainable technology includes the scientific understanding, development and application of a wide range of technologies and processes and their environmental implications. Systems and lifecycle analyses of energy systems, environmental management, agriculture, manufacturing and digital technologies provide a comprehensive method for understanding the full sustainability of processes. In addition, the development of clean processes through green chemistry and engineering techniques are also described. The book is the first multi-volume reference work to employ both Life Cycle Analysis (LCA) and Triple Bottom Line (TBL) approaches to assessing the wide range of technologies available and their impact upon the world. Both approaches are long established and widely recognized, playing a key role in the organizing principles of this valuable work. Provides readers with a one-stop guide to the most current research in the field Presents a grounding of the fundamentals of the field of sustainable technologies Written by international leaders in the field, offering comprehensive coverage of the field and a consistent, high-quality scientific standard Includes the Life Cycle Analysis and Triple Bottom Line approaches to help users understand and assess sustainable technologies

Systems Analysis for Sustainable Engineering: Theory and Applications

This book presents the application of system analysis techniques with case studies to help readers learn how the techniques can be applied, how the problems are solved, and which sustainable management strategies can be reached.

Sustainable Environmental Engineering

IMPLEMENT SYSTEMS ANALYSIS TOOLS IN SUSTAINABLE ENGINEERING Featuring a multidisciplinary approach, Systems Analysis for Sustainable Engineering: Theory and Applications provides a proven framework for applying systems analysis tools to account for environmental impacts, energy efficiency, cost-effectiveness, socioeconomic implications, and ecosystem health in engineering solutions. This pioneering work addresses the increased levels of sophistication embedded in many complex large-scale infrastructure systems and their interactions with the natural environment. After a detailed overview of sustainable systems engineering, the book covers mathematical theories of systems analysis, environmental resources management, industrial ecology, and sustainable design. Real-world examples highlight the methodologies presented in this authoritative resource. COVERAGE INCLUDES: Structured systems analysis for sustainable design Systems analysis and sustainable management strategies Economic valuation, instruments, and project selection Statistical forecasting models Linear, nonlinear, integer, and dynamic programming models Multicriteria decision analyses System dynamics models and simulation analyses Water resources and quality management Air quality management Solid waste management Soil and groundwater remediation planning Industrial ecology and sustainability Green building and green infrastructure systems Energy resources management and energy systems engineering Land resources management and agricultural sustainability

Sustainable Engineering

This book is a printed edition of the Special Issue "Life Cycle Assessment on Green Building Implementation" that was published in Sustainability

Sustainable Solid Waste Management

Systems analysis for sustainability is an emerging discipline where any technologies/processes or policies are evaluated comprehensively for sustainability. Trifold sustainability metrics such as technical feasibility, economic viability and environmental impacts are commonly used to assess sustainability. In addition to these metrics, it is important to consider resource sustainability, policies and social aspects for evaluating the sustainability of any proposed alternative. This approach results in identifying possible pitfalls early in the process so that truly sustainable alternative technologies, products and policies can be formulated. Green-Economy: Systems Analysis for Sustainability provides a theoretical background to perform such analyses. It demonstrates the application of these principles in practice with case studies carefully chosen from around the world to emerging technologies in the green economy. The first part of this book introduces methods and tools to perform technical feasibility analysis, economic viability analysis, environmental risk assessment, resource sustainability assessment, life cycle assessment (LCA), policy and social aspects of technologies and introduces resilience thinking. The second part of the book focuses on case studies with an emphasis on biofuels and bioproducts and food-energy-water nexus from across the globe.

MECHANICAL ENGINEERING, ENERGY SYSTEMS AND SUSTAINABLE DEVELOPMENT - Volume IV

A multidisciplinary introduction to sustainable engineering exploring challenges and solutions through practical examples and exercises.

Sustainability in the Design, Synthesis and Analysis of Chemical Engineering Processes

Thanks to economic incentives such as tax credits, green building has become a booming trend in the construction industry. This title is intended for electrical engineers, construction managers, construction and building inspectors.

Green Sustainable Process for Chemical and Environmental Engineering and Science

The latest developments regarding the theory and practice of effectively resolving conflict in water resources and environmental management are presented in this book by respected experts from around the globe. Water conflicts are particularly complex and challenging to solve because water and environmental issues span both the societal realm, in which people and organizations interact, and the physical world which sustains all human activities. For instance, when large-scale water diversions take place across political jurisdictions, conflicts may ensue among stakeholders within and across regions, while the water transfers may cause severe damage to sensitive ecological systems. Therefore, to arrive at realistic and fair resolutions, one must take into account not only the economics and politics of the situation but also the water quantity and quality changes that may occur within the altered hydrological system as well as the ecosystems contained therein. When the effects of climate change and the closely connected activities of energy production and usage are also considered, the complexity of the problem becomes even greater and messier. Accordingly, one must adopt an integrative and adaptive approach to water and environmental governance that specifically recognizes the conflicting value systems of stakeholders, including nature and future generations even though they are not present at the bargaining table. The 16 chapters in this leading-edge book are written by authors who presented their original research at the International Conference on Water Resources and Environment Research (ICWREER) 2013, which was held in Koblenz, Germany, from June 3rd to 7th, 2013, and subsequently submitted expanded versions of their research for review and publication in this timely book. The rich range of contributions are put into perspective in the first chapter and then categorized into four main interconnected parts: Part I: Management and Evaluation Part II: Global, Trans-boundary and International Dimensions Part III: Consensus-building, Bargaining and Negotiation Part IV: Ecological and Socio-economic Impacts

Sustainable Solid Waste Management

"A highly informative and brilliant contribution to the growing sustainability literature." -Dr. Brian and Mary Natrass Managing Partners of SustainabilityPartners and authors of The Natural Step for Business and Dancing with the Tiger The goal of sustainable development, a recent focus in the corporate world, is to "ensure a better quality of life for everyone today and in generations to come." The challenge facing industry leaders is how to reconcile economically competitive strategies with environmentally sound and socially responsible practices. Transforming Sustainability Strategy into Action: The Chemical Industry presents proven practical techniques to help managers in the chemical industry identify and assess options for improving the sustainability of their organizations, with a pragmatic emphasis on operational aspects, decision support, and guidelines for measuring progress. Employing a systematic approach and introducing globally proven problem-solving and decision-making tools designed to provoke questioning and creative thinking, the authors address some of the most challenging issues for the industrial world today. The authors' combined expertise and extensive experience in translating sustainability strategies from theory into action make them uniquely qualified to deliver the kind of hands-on, responsive business solutions that will give corporate leaders the competitive edge in preparing for tomorrow's socially and environmentally conscious marketplace.

Assessing and Measuring Environmental Impact and Sustainability

Summary: "This book brings together case study examples in the fields of sustainability, sustainable development, and education for sustainable development" --

Systems Analysis for Sustainable Engineering: Theory and Applications

Going beyond performing simple analyses, researchers involved in the highly dynamic field of computational intelligent data analysis design algorithms that solve increasingly complex data problems in changing environments, including economic, environmental, and social data. Computational Intelligent Data Analysis for Sustainable Development present

Computational Intelligent Data Analysis for Sustainable Development

Whole System Design is increasingly being seen as one of the most cost-effective ways to both increase the productivity and reduce the negative environmental impacts of an engineered system. A focus on design is critical as the output from this stage of the project locks in most of the economic and environmental performance of the designed system throughout its life which can span from a few years to many decades. Indeed it is now widely acknowledged that all designers - particularly engineers, architects and industrial designers - need to be able to understand and implement a whole system design approach. This book provides a clear design methodology based on leading efforts in the field and is supported by worked examples that demonstrate how advances in energy materials and water productivity can be achieved through applying an integrated approach to sustainable engineering. Chapters 1-5 outline the approach and explain how it can be implemented to enhance the established Systems Engineering framework. Chapters 6-10 demonstrate through detailed worked examples the application of the approach to industrial pumping systems passenger vehicles electronics and computer systems temperature control of buildings and domestic water systems. Published with The Natural Edge Project the World Federation of Engineering Organizations UNESCO and the Australian Government.

Engineering for Sustainability

With the encroachment of the Internet into nearly all aspects of work and life, it seems as though information is everywhere. However, there is information and then there is correct, appropriate, and timely information. While we might love being able to turn to Wikipedia® for encyclopedia-like information or search Google® for the thousands of links on a topic, engineers need the best information, information that is evaluated, up-to-date, and complete. Accurate, vetted information is necessary when building new skyscrapers or developing new prosthetics for returning military veterans. While the award-winning first edition of Using the Engineering Literature used a roadmap analogy, we now need a three-dimensional analysis reflecting the complex and dynamic nature of research in the information age. Using the Engineering Literature, Second Edition provides a guide to the wide range of resources available in all fields of engineering. This second edition has been thoroughly revised and features new sections on nanotechnology as well as green engineering. The information age has greatly impacted the way engineers find information. Engineers have an effect, directly and indirectly, on almost all aspects of our lives, and it is vital that they find the right information at the right time to create better products and processes. Comprehensive and up to date, with expert chapter authors, this book fills a gap in the literature, providing critical information in a user-friendly format.

Environmental Remote Sensing and Systems Analysis

This book reports on advanced theories and methods in two related engineering fields: electrical and electronic engineering, and communications engineering and computing. It highlights areas of global and growing importance, such as renewable energy, power systems, mobile communications, security and the Internet of Things (IoT). The contributions cover a number of current research issues, including smart grids, photovoltaic systems, wireless power transfer, signal processing, 4G and 5G technologies, IoT applications, mobile cloud computing and many more. Based on the proceedings of the Second International Conference on Emerging Trends in Electrical, Electronic and Communications Engineering

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(ELECOM 2018), held in Mauritius from November 28 to 30, 2018, the book provides graduate students, researchers and professionals with a snapshot of the state-of-the-art and a source of new ideas for future research and collaborations.

Transition Engineering

Mechanical Engineering, Energy Systems and Sustainable Development theme is a component of Encyclopedia of Physical Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty one Encyclopedias. The Theme on Mechanical Engineering, Energy Systems and Sustainable Development with contributions from distinguished experts in the field discusses mechanical engineering - the generation and application of heat and mechanical power and the design, production, and use of machines and tools. These five volumes are aimed at the following five major target audiences: University and College Students Educators, Professional Practitioners, Research Personnel and Policy Analysts, Managers, and Decision Makers, NGOs and GOs.

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