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FOCUSING ON CONTAMINANT FATE AND TRANSPORT, DESIGN OF ENVIRONMENTAL-CONTROL SYSTEMS, AND REGULATORY CONSTRAINTS This text-book details the fundamental equations that describe the fate and transport of contaminants in the water environment. The application of these fundamental equations to the design of environmental-control systems and methodologies for assessing the impact of contaminant discharges into rivers, lakes, wetlands, ground water, and oceans are all covered. Readers learn to assess how much waste can be safely assimilated into a water body by developing a solid understanding of the relationship between the type of pollutant discharged, the characteristics of the receiving water, and physical, chemical, and biological impacts. In cases of surface runoff from urban and agricultural watersheds, quantitative relationships between the quality of surface runoff and the characteristics of contaminant sources located within the watersheds are presented. Some of the text's distinguishing features include its emphasis on the engineering design of systems that control the fate and transport of contaminants in the water environment, the design of remediation systems, and regulatory constraints. Particular attention is given to use-attainability analyses and the estimation of total maximum daily loads, both of which are essential components of water-quality control in natural systems. Readers are provided with a thorough explanation of the complex set of laws and regulations governing water-quality control in the United States. Proven as an effective textbook in several offerings of the author's class "Water Quality Control in Natural Systems," the flow of the text is carefully structured to facilitate learning. Moreover, a number of practical pedagogical tools are offered: * Practical examples used throughout the text illustrate the effects of controlling the quality, quantity, timing, and distribution of contaminant discharges into the environment * End-of-chapter problems, and an accompanying solutions manual, help readers assess their grasp of each topic as they progress through the text * Several appendices with useful reference material are provided, including current U.S. Water Quality Standards * Detailed bibliography guides readers to additional resources to explore particular topics in greater depth With its emphasis on contaminant fate and transport and design of environmental-control systems, this text is ideal for upper-level undergraduates and graduate students in environmental and civil engineering programs. Environmental scientists and practicing environmental/civil engineers will also find the text relevant and useful.

Designed as a text for the undergraduate students of all branches of engineering, this compendium gives an opportunity to learn and apply the popular drafting software AutoCAD in designing projects. The textbook is organized in three comprehensive parts. Part I (AutoCAD) deals with the basic commands of AutoCAD, a popular drafting software used by engineers and architects. Part II (Projection Techniques) contains various projection techniques used in engineering for technical drawings. These techniques have been explained with a number of line diagrams to make them simple to the students. Part III (Descriptive Geometry), mainly deals with 3-D objects that require imagination. The accompanying CD contains the animations using creative multimedia and PowerPoint presentations for all chapters. In a nutshell, this textbook will help students maintain their cutting edge in the professional job market. KEY FEATURES : Explains fundamentals of imagination skill in generic and basic forms to crystallize concepts. Includes chapters on aspects of technical drawing and AutoCAD as a tool. Treats problems in the third angle as well as first angle methods of projection in line with the revised code of Indian Standard Code of Practice for General Drawing.

FUNDAMENTALS OF WATER SECURITY Understand How to Manage Water Resources to Equitably Meet Both Human and Ecological Needs Burgeoning populations and the ever-higher standards of living for those in emerging countries increase the demand on our water resources. What is not increasing, however, is the supply of water and the total amount of water in earth's biosphere—water that is integral to all standards of living. Fundamentals of Water Security provides a foundation for understanding and managing the quantity-quality-equity nexus of water security in a changing climate. In a broad sense, this volume explores solutions to water security challenges around the world. It is richly illustrated and pedagogically packed with up-to-date information. The text contains chapter learning objectives, foundation sections reviewing quantitative skills, case studies, and vignettes of people who have made important contributions to water security. To further aid comprehension, end-of-chapter problems are included—both qualitative and quantitative, with solutions available to instructors. Finally, extensive references feature books, journal articles, and government and NGO reports. Sample topics discussed include: How the study of water resources has evolved from a focus on physical availability to include social factors and governance How water security affects multiple disciplines across environmental science and engineering, hydrology, geography, water resources, atmospheric science, chemistry, biology, health science, and social and political science fields How to achieve a sufficient quantity and quality of water to equitably meet both immediate and long-term human and ecological needs Analysis of water security in an integrated manner by understanding the complex interactions between water quantity, water quality, and society Students taking courses on hydrology, water security, and/or water resource management, along with scientists working in fields where water security is a factor will be able to use Fundamentals of Water Security as a comprehensive textbook to understand and achieve water security. Completely updated and with three new chapters, this analysis of river dynamics is invaluable for advanced students, researchers and practitioners.

A truly classic air pollution text, this book is suitable for a variety of engineers and scientists who wish to gain an introduction to the field of air pollution. Known for its detailed development and application of equations, the text emphasizes an understanding of the relationship between sources and control of air pollution, rather than being a simple "handbook" on the subject. The book presents information on four broad areas of interest in the air

pollution field: the effects of pollutants on health and welfare; the laws and regulations that have been passed in efforts to improve air quality; the modeling of atmospheric dispersion of pollutants; the approaches to the control of emissions (from both stationary and mobile sources). The third edition of this text has been modified in a number of ways. New material has been added to bring the text up to date on the latest regulations including the Clean Air Act Amendments of 1990. The latest standards for ambient air quality and emission have been included in this revision. The authors continue to expose students to both the quantitative and the qualitative aspects of air quality management and air pollution control with several new questions and problems, with SI units emphasized to a greater extent than in the previous edition. The internet is also introduced as a valuable source of additional information. A web page is maintained by the authors which provides links to sources of interest to both instructors and students.

Building water-wise cities is a pressing need nowadays in both developed and developing countries. This is mainly due to the limitation of the available water resources and aging infrastructure to meet the needs of adapting to social and environmental changes and for urban liveability. This is the first book to provide comprehensive insights into theoretical, systematic, and engineering aspects of water-wise cities with a broad coverage of global issues. The book aims to (1) provide a theoretical framework of water-wise cities and associated sustainable water systems including key concepts and principles, (2) provide a brand-new thinking on the design and management of sustainable urban water systems of various scales towards a paradigm shift under the resource and environmental constraints, and (3) provide a technological perspective with successful case studies of technology selection, integration, and optimization on the "fit-for-purpose" basis.

For advanced undergraduate and beginning graduate students in atmospheric, oceanic, and climate science, Atmosphere, Ocean and Climate Dynamics is an introductory textbook on the circulations of the atmosphere and ocean and their interaction, with an emphasis on global scales. It will give students a good grasp of what the atmosphere and oceans look like on the large-scale and why they look that way. The role of the oceans in climate and paleoclimate is also discussed. The combination of observations, theory and accompanying illustrative laboratory experiments sets this text apart by making it accessible to students with no prior training in meteorology or oceanography. * Written at a mathematical level that is appealing for undergraduates and beginning graduate students * Provides a useful educational tool through a combination of observations and laboratory demonstrations which can be viewed over the web * Contains instructions on how to reproduce the simple but informative laboratory experiments * Includes copious problems (with sample answers) to help students learn the material.

Now in its sixth edition, Soil Mechanics Laboratory Manual is designed for the junior-level soil mechanics/geotechnical engineering laboratory course in civil engineering programs. It includes eighteen laboratory procedures that cover the essential properties of soils and their behavior under stress and strain, as well as explanations, procedures, sample calculations, and completed and blank data sheets. Written by Braja M. Das, respected author of market-leading texts in geotechnical and foundation engineering, this unique manual provides a detailed discussion of standard soil classification systems used by engineers: the AASHTO Classification System and the Unified Soil Classification System, which both conform to recent ASTM specifications. To improve ease and accessibility of use, this new edition includes not only the stand-alone version of the Soil Mechanics Laboratory Test software but also ready-made Microsoft ExcelRG templates designed to perform the same calculations. With the convenience of point and click data entry, these interactive programs can be used to collect, organize, and evaluate data for each of the book's eighteen labs. The resulting tables can be printed with their corresponding graphs, creating easily generated reports that display and analyze data obtained from the manual's laboratory tests. FeaturesBL Includes sample calculations and graphs relevant to each laboratory testBL Supplies blank tables (that accompany each test) for laboratory use and report preparationBL Contains a complete chapter on soil classification (Chapter 9)BL Provides references and three useful appendices: Appendix A: Weight-Volume Relationships Appendix B: Data Sheets for Laboratory Experiments Appendix C: Data Sheets for Preparation of Laboratory Reports

Specifically designed as an introduction to the exciting world of engineering, ENGINEERING FUNDAMENTALS: AN INTRODUCTION TO ENGINEERING encourages students to become engineers and prepares them with a solid foundation in the fundamental principles and physical laws. The book begins with a discovery of what engineers do as well as an inside look into the various areas of specialization. An explanation on good study habits and what it takes to succeed is included as well as an introduction to design and problem solving, communication, and ethics. Once this foundation is established, the book moves on to the basic physical concepts and laws that students will encounter regularly. The framework of this text teaches students that engineers apply physical and chemical laws and principles as well as mathematics to design, test, and supervise the production of millions of parts, products, and services that people use every day. By gaining problem solving skills and an understanding of fundamental principles, students are on their way to becoming analytical, detail-oriented, and creative engineers. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

This text is well-suited for a course in introductory environmental engineering for sophomore, or junior level students. The emphasis is on concepts, definitions, descriptions, and abundant illustrations, rather than on engineering design detail.

Appropriate for undergraduate engineering and science courses in Environmental Engineering. Balanced coverage of all the major categories of environmental pollution, with coverage of current topics such as climate change and ozone depletion, risk assessment, indoor air quality, source-reduction and recycling, and groundwater contamination.

It is estimated that literally billions of residents in urban and peri-urban areas of Africa, Asia, and Latin America are served by onsite sanitation systems (e.g. various types of latrines and septic tanks). Until recently, the management of faecal sludge from these onsite systems has been grossly neglected, partially as a result of them being considered temporary solutions until sewer-based systems could be implemented. However, the perception of onsite or decentralized sanitation technologies for urban areas is gradually changing, and is increasingly being considered as long-term, sustainable options in urban areas, especially in low- and middle-income countries that lack sewer infrastructures. This is the first book dedicated to faecal sludge management. It compiles the current state of knowledge of the rapidly evolving field of faecal sludge management, and presents an integrated approach that includes technology, management, and planning based on Sandecs 20 years of experience in the field. Faecal Sludge Management: Systems Approach for Implementation and Operation addresses the organization of the entire faecal sludge management service chain, from the collection and transport of sludge, and the current state of knowledge of treatment options, to the final end use or disposal of treated sludge. The book also presents important factors to consider when evaluating and upscaling new treatment technology options. The book is designed for undergraduate and graduate students, and engineers and practitioners in the field who have some basic knowledge of environmental and/or wastewater engineering.

Our planet is undergoing radical environmental and social changes. Sustainability has now been put into question by, for example, our consumption patterns, loss of biodiversity, depletion of resources, and exploitative power relations. With apparent ecological and social limits to globalization and development, current levels of consumption are unsustainable, inequitable, and inaccessible to the majority of humans. Understanding and attaining sustainability is a crucial matter at a time when our planet is in peril—environmentally, economically, socially, and politically. Since its official inception in the 1970s, environmental sociology has provided a powerful lens to understanding the challenges, possibilities and modes of sustainability. Most chapters in this book were published as peer-reviewed articles in Sustainability in its special issue "Sustainability through the Lens of Environmental Sociology," providing an environmental sociology approach to understanding and achieving the widely used notion of "sustainability." This edited collection covers, among other topics, the inherent discursive formations of environmental sociology, conceptual tools and paradoxes, competing theories and practices, and their complex implications on our society at large. Chapters in this book specifically focus on how sustainable development has been understood through different theoretical lenses in environmental sociology, such as ecological modernization, policy/reformist sustainable development, and critical structural approaches (such as the treadmill of production, ecological Marxism, metabolic rift theory, etc.); and how sustainable development has been practiced in, or by, various stakeholders, such as states, corporations, and local communities, for various ends, through the use of specific case studies, showing, for example, the discursive shifts, dynamic formations, and diverse contours of sustainable development. The range of relevant topics includes: - Environmental sociology as a field of inquiry for sustainability - Historical context of sustainable development in environmental sociology - Nature-society relationship in environmental sociology - Theories/approaches to sustainability discourse in environmental sociology - Environmentalism/environmental movements for sustainability - Empirical cases (such as climate change, biodiversity, food, certification, etc.) through the lens of environmental sociology

Owing to climate change related uncertainties and anticipated population growth, different parts of the developing and the developed world (particularly urban areas) are experiencing water shortages or flooding and security of fit-for-purpose supplies is becoming a major issue. The emphasis on decentralized alternative water supply systems has increased considerably. Most of the information on such systems is either scattered or focuses on large scale reuse with little consideration given to decentralized small to medium scale systems. Alternative Water Supply Systems brings together recent research into the available and innovative options and additionally shares experiences from a wide range of contexts from both developed and developing countries. Alternative Water Supply Systems covers technical, social, financial and institutional aspects associated with decentralized alternative water supply systems. These include systems for greywater recycling, rainwater harvesting, recovery of water through condensation and sewer mining. A number of case studies from the UK, the USA, Australia and the developing world are presented to discuss associated environmental and health implications. The book provides insights into a range of aspects associated with alternative water supply systems and an evidence base (through case studies) on potential water savings and trade-offs. The information organized in the book is aimed at facilitating wider uptake of context specific alternatives at a decentralized scale mainly in urban areas. This book is a key reference for postgraduate level students and researchers interested in environmental engineering, water resources management, urban planning and resource efficiency, water demand management, building service engineering and sustainable architecture. It provides practical insights for water professionals such as systems designers, operators, and decision makers responsible for planning and delivering sustainable water management in urban areas through the implementation of decentralized water recycling. Authors: Fayyaz Ali Memon, Centre for Water Systems, University of Exeter, UK and Sarah Ward, Centre for Water Systems, University of Exeter, UK

Comprehensive coverage of the fundamental principles and current practices in water processing, water distribution, wastewater collection, wastewater treatment, and sludge disposal.

This comprehensive new edition tackles the multiple aspects of environmental engineering, from solid waste disposal to air and noise pollution. It places a much-needed emphasis on fundamental concepts, definitions, and problem-solving while providing updated problems and discussion questions in each chapter. Introduction to Environmental Engineering also includes a discussion of environmental legislation along with environmental ethics case studies and problems to present the legal framework that governs environmental engineering design.

As the world's population has increased, sources of clean water have decreased, shifting the focus toward pollution reduction and control. Disposal of wastes and wastewater without treatment is no longer an option. Fundamentals of Wastewater Treatment and Engineering introduces readers to the essential concepts of wastewater treatment, as well as t

This book provides insights into waste management practices in developing countries, and the application of research and innovation in finding appropriate solutions to improved waste management. The chapters have been selected with a focus on organic waste beneficiation, a significant waste stream in developing countries; the role of government and associated policy interventions; citizen behaviour in support of greater waste recycling;

and the safe management of hazardous waste, particularly healthcare risk waste.

Publisher's description: This book effectively conveys the key concepts of equilibrium chemistry, particularly as they apply to natural and engineered aquatic systems. The coverage is rigorous and thorough, but the author assumes little prior knowledge of chemistry on the part of the readers, and writes in a style that is easily accessible to students.

Suitable for university undergraduate courses but also serves as a useful reference book for graduate students and practicing engineers.

Environmental Engineering: Fundamentals, Sustainability, Design presents civil engineers with an introduction to chemistry and biology, through a mass and energy balance approach. ABET required topics of emerging importance, such as sustainable and global engineering are also covered. Problems, similar to those on the FE and PE exams, are integrated at the end of each chapter. Aligned with the National Academy of Engineering's focus on managing carbon and nitrogen, the 2nd edition now includes a section on advanced technologies to more effectively reclaim nitrogen and phosphorous. Additionally, readers have immediate access to web modules, which address a specific topic, such as water and wastewater treatment. These modules include media rich content such as animations, audio, video and interactive problem solving, as well as links to explorations. Civil engineers will gain a global perspective, developing into innovative leaders in sustainable development.

This book covers the fundamentals of environmental engineering and applications in water quality, air quality, and hazardous waste management. It begins by describing the fundamental principles that serve as the foundation of the entire field of environmental engineering. Readers are then systematically reintroduced to these fundamentals in a manner that is tailored to the needs of environmental engineers, and that is not too closely tied to any specific application.

This report reviews engineering's importance to human, economic, social and cultural development and in addressing the UN Millennium Development Goals. Engineering tends to be viewed as a national issue, but engineering knowledge, companies, conferences and journals, all demonstrate that it is as international as science. The report reviews the role of engineering in development, and covers issues including poverty reduction, sustainable development, climate change mitigation and adaptation. It presents the various fields of engineering around the world and is intended to identify issues and challenges facing engineering, promote better understanding of engineering and its role, and highlight ways of making engineering more attractive to young people, especially women.--Publisher's description.

This book focuses on ecological wisdom inspired restoration engineering through theories, hypotheses, policies, practical understanding, and case studies. Understanding nature's processes is a prerequisite for the healthy and sustainable functioning of a habitable Earth. As such, the book provides a guide for readers seeking to understand and build sustainable, urban socio-ecological systems using restoration technologies based on wisdom. Motivated by recent rapid advances in restoration engineering, such as the role of green building materials in urban infrastructures, and developing sustainable landscapes to benefit the environment, economy and communities, it is an essential reference on the most promising innovative technologies. It discusses engineering methods and practices in the restoration of soil, water, heritage sites, and other ecosystems, as well as the development and applications of green building materials. It presents a holistic and systematic approach that utilizes natural resources and the concept of ecological wisdom to reap sustainable environmental, economic and social benefits to fulfill the concept of living in harmony with nature. This book is a valuable resource for civil- and environmental engineering researchers as well as organizations engaged in eco-restoration practices.

This edited volume presents the research results of the Collaborative Research Center 1026 "Sustainable manufacturing - shaping global value creation". The book aims at providing a reference guide of sustainable manufacturing for researchers, describing methodologies for development of sustainable manufacturing solutions. The volume is structured in four chapters covering the following topics: sustainable manufacturing technology, sustainable product development, sustainable value creation networks and systematic change towards sustainable manufacturing. The target audience comprises both researchers and practitioners in the field of sustainable manufacturing, but the book may also be beneficial for graduate students.

In Introduction to Environmental Engineering, First Edition, authors Richard Mines and Laura Lackey explain complicated environmental systems in easy-to-understand terms, providing numerous examples and an emphasis on current environmental issues such as global warming, the failing infrastructure within the United States, risk assessment, and hazardous waste remediation. KEY TOPICS: Environmental Engineering as a Profession; Introduction to Environmental Engineering Calculations: Dimensions, Units, and Conversions; Essential Chemical Concepts; Biological and Ecological Concepts; Risk Assessment; Design and Modeling of Environmental Systems; Sustainability and Green Development; Water Quality and Pollution; Water Treatment; Domestic Wastewater Treatment; Air Pollution; Fundamentals of Hazardous Waste Site Remediation; Introduction to Solid Waste Management. MARKET: Appropriate for engineers interested in a comprehensive and up-to-date introduction to environmental engineering.

A banner edition of the prominent reference covering environmental engineering Upholding the reputation of its predecessors as the most trusted single-source handbook on the subject, this new edition of Environmental Engineering provides up-to-date, practical guidance on a full range of environmental issues, while delivering the critical material on sanitation management and engineering used by today's leaders in the field. Emphasizing environmental control through practical applications of sanitary science and engineering theories and principles, this Fifth Edition includes new chapters from leading experts, as well as new material by Franklin Agardy; Anthony Wolbarst and Weihshueh Chiu; George Tchobanoglous; Walter Lyon; Glen Nemerow and Laurie Bloomer; John Kieffer; Tim Chinn; Robert Jacko and Tim LaBreche; and Xudong Yang. Environmental Engineering's highly illustrative coverage addresses environmental control in urban, suburban, and rural settings—including general design, construction, maintenance, and operation details related to plants and structures—with new material on such topics as: Soil and groundwater remediation Radiation exposure and safety Environmental emergencies and preparedness Hazardous waste remediation Incineration Transporting pollutants Communicable and noninfectious diseases Food protection Noise control Water filtration system technology Solid waste management Environmental Engineering, Fifth Edition is an essential reference for environmental and civil engineers, environmental consultants and scientists, and regulatory and safety professionals in the public and private sectors.

There are 2.4 billion people without improved sanitation and another 2.1 billion with inadequate sanitation (i.e. wastewater drains directly into surface waters), and despite improvements over the past decades, the unsafe management of fecal waste and wastewater continues to present a major risk

to public health and the environment (UN, 2016). There is growing interest in low cost sanitation solutions which harness natural systems. However, it can be difficult for wastewater utility managers to understand under what conditions such nature-based solutions (NBS) might be applicable and how best to combine traditional infrastructure, for example an activated sludge treatment plant, with an NBS such as treatment wetlands. There is increasing scientific evidence that treatment systems with designs inspired by nature are highly efficient treatment technologies. The cost-effective design and implementation of ecosystems in wastewater treatment is something that exists and has the potential to be further promoted globally as both a sustainable and practical solution. This book serves as a compilation of technical references, case examples and guidance for applying nature-based solutions for treatment of domestic wastewater, and enables a wide variety of stakeholders to understand the design parameters, removal efficiencies, costs, co-benefits for both people and nature and trade-offs for consideration in their local context. Examples through case studies are from across the globe and provide practical insights into the variety of potentially applicable solutions.

Solid waste management issues, technologies and challenges are dynamic. More so, in developing and transitory nations in Asia. This book, written by Asian experts in solid waste management, explores the current situation in Asian countries including Pacific Islands. There are not many technical books of this kind, especially dedicated to this region of the world. The chapters form a comprehensive, coherent investigation in municipal solid waste (MSW) management, including, definitions used, generation, sustainable waste management system, legal framework and impacts on global warming. Several case studies from Asian nations are included to exemplify the real situation experienced. Discussions on MSW policy in these countries and their impacts on waste management and minimization (if any) are indeed an eye-opener. Undoubtedly, this book would be a pioneer in revealing the latest situation in the Asian region, which includes two of the world's most dynamic nations in the economic growth. It is greatly envisaged to form an excellent source of reference in MSW management in Asia and Pacific Islands. This book will bridge the wide gap in available information between the developed and transitory/developing nations.

Develop a better understanding of what causes environmental problems and how to solve them! Today, engineers and scientists must work on more complex environmental problems than ever before. To find solutions to these problems requires an in-depth knowledge of the fundamentals of chemistry, biology, and physical processes. This text will provide you with a clear explanation of these fundamentals that are necessary for solving both small town and global environmental problems. With Fundamentals of Environmental Engineering, you'll develop a better understanding of the key concepts required for design, operation, analysis, and modeling of both natural and engineered systems. You'll also be able to make connections among the different specialty areas of environmental engineering emphasized throughout the text. And you'll quickly learn how to solve complex environmental problems and incorporate environmental concerns into your specialty. Key Features * Covers the fundamentals of chemical, physical, and biological processes, and various units of concentration as applied to environmental engineering. * Includes applications related to drinking water and wastewater treatment, air quality engineering and science, groundwater transport and remediation, surface water quality, hazardous solid waste management, and ecosystems. * Developed by a team of authors who specialize in a diverse set of environmental areas.

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.

Water Recycling and Resource Recovery in Industry: Analysis, Technologies and Implementation provides a definitive and in-depth discussion of the current state-of-the-art tools and technologies enabling the industrial recycling and reuse of water and other resources. The book also presents in detail how these technologies can be implemented in order to maximize resource recycling in industrial practice, and to integrate water and resource recycling in ongoing industrial production processes. Special attention is given to non-process engineering aspects such as systems analysis, software tools, health, regulations, life-cycle analysis, economic impact and public participation. Case studies illustrate the huge potential of environmental technology to optimise resource utilisation in industry. The large number of figures, tables and case studies, together with the book's multidisciplinary approach, makes Water Recycling and Resource Recovery in Industry: Analysis, Technologies and Implementation the perfect reference work for academics, professionals and consultants dealing with industrial water resources recovery. Contents Part I: Industrial reuse for environmental protection Part II: System analysis to assist in closing industrial resource cycles Part III: Characterisation of process water quality Part IV: Technological aspects of closing industrial cycles Part V: Examples of closed water cycles in industrial processes Part VI: Resource protection policies in industry

This book presents a systems thinking approach in relation to the Sustainable Development Goals for sustainable national development in vulnerable countries. Systems thinking is a process for understanding the interrelationships among the key components of a system; this book illustrates sustainable development as a system. Key environmental issues are discussed showing their relationship to socioeconomic aspects of development, in the light of increased climate threats and environmental disasters.

The United Nations World Water Assessment Programme (WWAP) is hosted and led by UNESCO. WWAP brings together the work of 31 UN-Water Members and 38 Partners to publish The United Nations World Water Development Report, (WWDR) series. The annual World Water Development Reports focus on strategic water issues. UN-Water Members and Partners, all experts in their respective fields, contribute the latest findings on a specific theme. The 2017 edition of the World Water Development Report focuses on 'Wastewater' and seeks to inform decision-makers, inside and outside the water community, about the importance of managing wastewater as an undervalued and sustainable source of water, energy, nutrients and other recoverable by-products, rather than something to be disposed of or a nuisance to be ignored. The report's title - Wastewater: The Untapped Resource - reflects the critical role that wastewater is poised to play in the context of a circular economy, whereby economic development is balanced with the protection of natural resources and environmental sustainability, and where a cleaner and more sustainable economy has a positive effect on the water quality. Improved wastewater management is not only critical to achieving the Sustainable Development Goal on clean water and sanitation (SDG 6), but also to other goals of the 2030 Agenda for Sustainable Development.

KEY BENEFIT The first book of its kind devoted completely to industrial ecology/green engineering, this introduction uses industrial ecology principles and cases to ground the discussion of sustainable engineering-and offers practical and reasonable approaches to design decisions. KEY TOPICS Technology and Sustainability; Industrial Ecology(IE) and Sustainable Engineering (SE) Concepts; Relevance of Biological Ecology to Technology; Metabolic Analysis; Technological Change and Evolving Risk; Social Dimensions of Industrial Ecology; Concept of Sustainability; SE; Industrial Product Development; Design for Environment and for Sustainability; Introduction to Life-Cycle Assessment; LCA Impact and Interpretation Stages; Streamlining the LCA Process; Systems Analysis; Industrial Ecosystems; Material Flow Analysis; National Material Accounts; Energy and IE; Water and IE; Urban IE; Modeling in IE; Scenarios for IE; Status of Resources; IE and SE in Developing Countries; IE and Sustainability in the Corporation/Government/Society MARKET A useful reference for professionals in environmental science, environmental policy, and engineering.

Explains the fundamental theory and mathematics of water and wastewater treatment processes By carefully explaining both the underlying theory and the underlying mathematics, this text enables readers to fully grasp the fundamentals of physical and chemical treatment processes for water and wastewater. Throughout the book, the authors use detailed examples to illustrate real-world challenges and their solutions, including step-by-step mathematical calculations. Each chapter ends with a set of problems that enable readers to put their knowledge into practice by developing and analyzing complex processes for the removal of soluble and particulate materials in order to ensure the safety of our water supplies. Designed to give readers a deep understanding of how water treatment processes actually work, Water Quality Engineering explores: Application of mass balances in continuous flow systems, enabling readers to understand and predict changes in water quality Processes for removing soluble contaminants from water, including treatment of municipal and industrial wastes Processes for removing particulate materials from water Membrane processes to remove both soluble and particulate materials Following the discussion of mass balances in continuous flow systems in the first part of the book, the authors explain and analyze water treatment processes in subsequent chapters by setting forth the relevant mass balance for the process, reactor geometry, and flow pattern under consideration. With its many examples and problem sets, Water Quality Engineering is recommended as a textbook for graduate courses in physical and chemical treatment processes for water and wastewater. By drawing together the most recent research findings and industry practices, this text is also recommended for professional environmental engineers in search of a contemporary perspective on water and wastewater treatment processes.

Richard Jaeger and Travis Blalock present a balanced coverage of analog and digital circuits; students will develop a comprehensive understanding of the basic techniques of modern electronic circuit design, analog and digital, discrete and integrated. A broad spectrum of topics are included in Micro-electronic Circuit Design which gives the professor the option to easily select and customize the material to satisfy a two-semester or three-quarter sequence in electronics. Jaeger/Blalock emphasizes design through the use of design examples and design notes. Excellent pedagogical elements include chapter opening vignettes, chapter objectives, "Electronics in Action" boxes, a problem-solving methodology, and "Design Note" boxes. The use of the well-defined problem-solving methodology presented in this text can significantly enhance an engineer's ability to understand the issues related to design. The design examples assist in building and understanding the design process.