Physical Chemical Treatment Of Water And Wastewater

The third in the self-paced distance learning seri

Environmental pollution is known as any deterioration in the physical, chemical and biological quality of the environment. The pollutants fall under the broad category of xenobiotic compounds and are released into the environment by the actions of human and occur at concentrations higher than "natural levels". Environmental pollution can be implied by any alternation in the surroundings. All types of environmental pollution may affect directly or indirectly the living organisms and particularly human health. The textile industry is amongst the major contributors to environmental pollution but it is very important for the nation's economy. This book provides the latest research on a non-conventional method effective in treatment of textile wastewater. (Imprint: Nova)

Provides a comprehensive overview of key methods for treating water tainted by cyanobacteria and cyanotoxins Toxigenic cyanobacteria are one of the main health risks associated with water resources. Consequently, the analysis, control, and removal of cyanobacteria and cyanotoxins from water supplies is a high priority research area. This book presents a comprehensive review of the state-of-the-art research on water treatment methods for the removal of cyanobacteria, taste and odor compounds, and cyanotoxins. Starting with an introduction to the subject, Water Treatment for Purification from Cyanobacteria and Cyanotoxins offers chapters on cyanotoxins and human health, conventional physical-chemical treatment for the removal of cyanobacteria/cyanotoxins, removal of cyanobacteria and cyanotoxins by membrane processes, biological treatment for the destruction of cyanotoxins, and conventional disinfection and/or oxidation processes. Other chapters look at advanced oxidation processes, removal/destruction of taste and odour compounds, transformation products of cyanobacterial metabolites during treatment and integrated drinking water processes. Provides a comprehensive overview of key methods for treating water tainted by cyanobacteria and cyanotoxins Bridges the gap between basic knowledge of cyanobacteria/cyanotoxins and practical management guidelines Includes integrated processes case studies and real-life examples Developed within the frame of the European Cooperation in Science and Technology (COST)–funded CYANOCOST A must-have resource for every water treatment plant, Water Treatment for Purification from Cyanobacteria and Cyanotoxins is a valuable resource for all researchers in water chemistry and engineering, environmental chemistry as well as water companies and authorities, water resource engineers and managers, environmental and public health protection organizations.

Water Quality Engineering

Symposium on Physical-Chemical Treatment from Municipal and Industrial Sources

Water Treatment for Purification from Cyanobacteria and Cyanotoxins

Ammonia Removal in a Physical-chemical Wastewater Treatment Process

Applications of New Concepts of Physical-Chemical Wastewater Treatment

Advanced Water Treatment

Chemistry of Ozone in Water and Wastewater Treatment book will discuss mechanistic details of ozone reactions as much as they are known to date and apply them to the large body of studies on micropollutant degradation such as pharmaceuticals and endocrine disruptors that is already available.

The books currently available on this subject contain some elements of physical-chemical treatment of water and wastewater but fall short of giving comprehensive and authoritative coverage. They contain some equations that are not substantiated, offering empirical data based on assumptions that are therefore difficult to comprehend. This text brings together the information previously scattered in several books and adds the knowledge from the author's lectures on wastewater engineering. Physical-Chemical Treatment of Water and Wastewater is not only descriptive but is also analytical in nature. The work covers the physical unit operations and unit processes utilized in the treatment of water and wastewater. Its organization is designed to match the major processes and its approach is mathematical. The authors stress the description and derivation of processes and process parameters in mathematical terms, which can then be generalized into diverse empirical situations. Each chapter includes design equations, definitions of symbols, a glossary of terms, and worked examples. One author is an environmental engineer and a professor for over 12 years and the other has been in the practice of environmental engineering for more than 20 years. They offer a sound analytical mathematical foundation and description of processes. Physical-Chemical Treatment of Water and Wastewater fills a niche as the only dedicated textbook in the area of physical and chemical methods, providing an analytical approach applicable to a range of empirical situations Contents Introduction Characteristics of Water and Wastewater Quantity of Water and Wastewater Constituents of Water and Wastewater Unit Operations of Water and Wastewater Treatment Flow Measurements and Flow and Quality Equalizations Pumping Screening, Settling, and Flotation Mixing and Flocculation Conventional Filtration Advanced Filtration and Carbon Adsorption Aeration, Absorption, and Stripping Unit Processes of Water and Wastewater Treatment Water Softening Water Stabilization Coagulation Removal of Iron and Manganese by Chemical Precipitation Removal of Phosphorus by Chemical Precipitation Removal of Nitrogen by Nitrification-Denitrification Ion Exchange Disinfection

Recently, research efforts aiming to improve energy efficiency of wastewater treatment processes for large centralized wastewater treatment plants (WWTPs) have been increasing. Global warming impacts, energy sustainability, and biosolids generation are among several key drivers towards the establishment of energy-efficient WWTPs. WWTPs have been recognized as major contributors of greenhouse gas emissions as these are significant energy consumers in the industrialized world. The quantity of biosolids or excess waste activated sludge produced by WWTP will increase in the future due to population growth and this pose environmental concerns and solid waste disposal issues. Due to limited capacity of landfill sites, more stringent environmental legislation, and air pollution from incineration sites, there is a need to rethink the conventional way of dealing with wastewater and the sludge production that comes with it. This book provides an overview of advanced biological, physical and chemical treatment with the aim of reducing the volume of sewage sludge. Provides a comprehensive list of processes aiming at reducing the volume of sewage sludge and increasing biogas production from waste activated sludge. Includes clear process flowsheet showing how the process is modified compared to the conventional waste activated sludge process. Provides current technologies applied on full scale plant as well as methods still under investigation at laboratory scale. Offers data from pilot scale experience of these processes

Theory and Practice of Water and Wastewater Treatment

Physical and Chemical Separation in Water and Wastewater Treatment

Physical-chemical Treatment

Handbook of Textile Effluent Remediation

An Innovative Role of Biofiltration in Wastewater Treatment Plants (WWTPs)

Physical and Chemical

The unit process approach, common in the field of chemical engineering, was introduced about 1962 to the field of environmental engineering. An understanding of unit processes is the foundation for continued learning and for designing treatment systems. The time is ripe for a new textbook that delineates the role of unit process principles in environmental engineering. Suitable for a two-semester course, Water Treatment Unit Processes: Physical and Chemical provides the grounding in the underlying principles of each unit process that students need in order to link theory to practice. Bridging the gap between scientific principles and engineering practice, the book covers approaches that are common to all unit processes as well as principles that characterize each unit process. Integrating theory into algorithms for practice, Professor Hendricks emphasizes the fundamentals, using simple explanations and avoiding models that are too complex mathematically, allowing students to assimilate principles without getting sidelined by excess calculations. Applications of unit processes principles are illustrated by example problems in each chapter. Student problems are provided at the end of each chapter; the solutions manual can be downloaded from the CRC Press Web site. Excel spreadsheets are integrated into the text as tables designated by a "CD" prefix. Certain spreadsheets illustrate the idea of "scenarios" that emphasize the idea that design solutions depend upon assumptions and the interactions between design variables. The spreadsheets can be downloaded from the CRC web site. The book has been designed so that each unit process topic is self-contained, with sidebars and examples throughout the text. Each chapter has subheadings, so that students can scan the pages and identify important topics with little effort. Problems, references, and a glossary are found at the end of each chapter. Most chapters contain downloadable Excel spreadsheets integrated into the text and appendices with additional information. Appendices at the end of the book provide useful reference material on various topics that support the text. This design allows students at different levels to easily navigate through the book and professors to assign pertinent sections in the order they prefer. The book gives your students an understanding of the broader aspects of one of the core areas of the environmental engineering curriculum and knowledge important for the design of treatment systems.

Nowadays, textile units utilize a number of dyes, chemicals, reagents, and solvents to impart the desired quality to fabrics, and generate a substantial quantity of effluents/contaminants, which cause severe environmental problems if disposed of without proper treatment. In view of several surveys carried out through research papers, books, technical articles, and general reports published in high-repute academic societies, Handbook of Textile Effluent Remediation provides a detailed narration of the acceptable methods of treating textile wastewater, such as active ozonation, membrane filtration, and adsorption. The book discusses emerging and suitable treatment systems that are viable, efficient, and economical. In this context, it provides an array of several traditional as well as advanced treatment practices for textile effluents. It covers research-oriented descriptions of textile wastewater treatment that can be adopted by scientific communities, academicians, and undergraduate and postgraduate students of industrial engineering, materials science and engineering, physics, and chemistry. It offers several interesting methodologies and aspects of current dimensional research through user-friendly content, tables, and figures and provides up-to-date literature on important and useful information for textile effluents, their impact on the environment, and advanced remediation processes. Needless to say, this book is of immense use to global researchers, academicians, and consultants engaged in various streams of wastewater treatment science.

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.

Wastewater Treatment Engineering

WATER - 1976. Pt. 1. Physical Chemical Wastewater Treatment

Advanced Oxidation Processes

Water - 1976

Evaluation of Physical-chemical Technologies for Water Reuse, Byproduct Recovery and Wastewater Treatment in the Food Processing Industry

A New Process for Treating Wastewater

This book shines a light on drinking water treatment methods and scale of operation specifically for the developing countries. With case studies connecting theory to real world matters, this book is ideal for graduate and postgraduate level course use in engineering departments or for self-study and research.

Physical-chemical treatment systems can be incorporated into the process line of an industry or may be used to enhance an existing treatment system. The more consistent effluent quality from physical-chemical treatment systems makes them amenable to byproduct recovery or water reuse schemes. While many such systems are more expensive than conventional treatment, the prospect of valuable byproduct recovery makes them more attractive. The objective of this manual is to provide a comprehensive review of physical-chemical and advanced treatment technologies and their application to the food industry. Such documentation should provide food industry personnel with valuable information on treatment alternatives to meet their specific needs. A general section covering the economic considerations is included to augment the design criteria. Case histories from the majority of the food industry have been included to add operational information.

An Applied Guide to Water and Effluent Treatment Plant Design is ideal for chemical, civil and environmental engineering students, graduates, and early career water engineers as well as more experienced practitioners who are transferring into the water sector. It brings together the design of process, wastewater, clean water, industrial effluent and sludge treatment plants, looking at the different treatment objectives within each sub-sector, selection and design of physical, chemical and biological treatment processes, and the professional hydraulic design methodologies. This book will show you how to carry out the key steps in the process design of all kinds of water and effluent treatment plants. It provides an essential refresher on the relevant underlying principles of engineering science, fluid mechanics, water chemistry and biology, together with a thorough description of the heuristics and rules of thumb commonly used by experienced practitioners. The water treatment plant designer will also find specific advice on plant layout, aesthetics, economic considerations and related issues such as odor control. The information contained in this book is usually provided on the job by mentors so it will remain a vital resource throughout your career. Explains how to design water and effluent treatment plants that really work Accessible introduction to, and overview of, the area that is written from a process engineering perspective Covers new treatment technologies and the whole process, from treatment plant design, to commissioning

Non-Conventional Textile Waste Water Treatment

1976,1. Physical, chemical wastewater treatment. - 1977

MWH's Water Treatment

Advanced Biological, Physical, and Chemical Treatment of Waste Activated Sludge

Design of Facilities for Physical-chemical Wastewater Treatment of Raw Waste Water

Many physico-chemical and operational factors influence the performance, treatment costs, and longterm stability of biofilters for the treatment of wastewater. An innovative role of biofiltration in wastewater treatment plants (WWTPs) focuses on identifying the factors that affect biofiltration, such as the hydraulic retention time of the biofiltration system, the type and characteristics of the filter, and the attached biomass, explains their influence and provides guidelines on how to control these factors to optimize better operation with respect to pollutant control present in (WWTPs). The fundamental basis of the treatment in biofilters is the action of pollutant-degrading microorganisms and consequently the book also discusses in depth about the microbial ecology of biofiltration. In addition, it explores the applications of biofiltration including the removal of emerging pollutants. Describes the microbial ecology of biofiltration Includes modeling of biofiltration Describes the designing of biofilters, start-up, and monitoring Discusses the mechanism of biofiltration Describes the controlling and operational factors of biofiltration

Carefully designed to balance coverage of theoretical and practical principles, Fundamentals of Water Treatment Unit Processes delineates the principles that support practice, using the unit processes approach as the organizing concept. The author covers principles common to any kind of water treatment, for example, drinking water, municipal wastewater, industrial water treatment, industrial waste water treatment, and hazardous wastes. Since technologies change but principles remain constant, the book identifies strands of theory rather than discusses the latest technologies, giving students a clear understanding of basic principles they can take forward in their studies. Reviewing the historical development of the field and highlighting key concepts for each unit process, each chapter follows a general format that consists of process description, history, theory, practice, problems, references, and a glossary. This organizational style facilitates finding sections of immediate interest without having to page through an excessive amount of material. Pedagogical Features End-of-chapter glossaries provide a ready reference and add terms pertinent to topic but beyond the scope of the chapter Sidebars sprinkled throughout the chapters present the lore and history of a topic, enlarging students' perspective Example problems emphasize tradeoffs and scenarios rather than single answers and involve spreadsheets Reference material includes several appendices and a quick-reference spreadsheet Solutions manual includes spreadsheets for problems Supporting material is available for download Understanding how the field arrived at its present state of the art places the technology in a more logical context and gives students a strong foundation in basic principles. This book does more than build technical proficiency, it adds insight and understanding to the broader aspects of water treatment unit processes.

The books currently available on this subject contain some elements of physical-chemical treatment of water and wastewater but fall short of giving comprehensive and authoritative coverage. They contain some equations that are not substantiated, offering empirical data based on assumptions that are therefore difficult to comprehend. This text brings together the information previously scattered in several books and adds the knowledge from the author's lectures on wastewater engineering. Physical-Chemical Treatment of Water and Wastewater is not only descriptive but is also analytical in nature. The work covers the physical unit operations and unit processes utilized in the treatment of water and wastewater. Its organization is designed to match the major processes and its approach is mathematical. The authors stress the description and derivation of processes and process parameters in mathematical terms, which can then be generalized into diverse empirical situations. Each chapter includes design equations, definitions of symbols, a glossary of terms, and worked examples. One author is an environmental engineer and a professor for over 12 years and the other has been in the practice of environmental engineering for more than 20 years. They offer a sound analytical mathematical foundation and description of processes. Physical-Chemical Treatment of Water and Wastewater fills a niche as the only dedicated textbook in the area of physical and chemical methods, providing an analytical approach applicable to a range of empirical situations

Physical-chemical Waste-water Treatment Plant Design

Taft Center, Cincinnati, Ohio, November 12-14, 1975

Integrated and Hybrid Process Technology for Water and Wastewater Treatment

II: Biological Wastewater Treatement

Physical-Chemical Treatment of Water and Wastewater

Water Treatment Unit Processes

the definitive guide to the theory and practice of water treatment engineering THIS NEWLY REVISED EDITION of the classic reference provides complete, up-to-date coverage of both theory and practice of water treatment system design. The Third Edition brings the field up to date, addressing new regulatory requirements, ongoing environmental concerns, and the emergence and other new chemical constituents in water. Written by some of the foremost experts in the field of public water supply, Water Treatment, Third Edition maintains the book's broad scope and reach, while reorganizing the material for even greater clarity and readability. Topics span from the fundamentals of water chemistry and microbiology to the latest methods for detecting co leading-edge technologies for implementing water treatment processes, and the increasingly important topic of managing residuals from water treatment plants. Along with hundreds of illustrations, photographs, and extensive tables listing chemical properties and design data, this volume: Introduces a number of new topics such as advanced oxidation and enhanced coagulation strategies for removing pharmaceuticals and personal care products Examines advanced treatment technologies such as membrane filtration, reverse osmosis, and ozone addition Details reverse osmosis applications for brackish groundwater, wastewater, and other water sources Provides new case studies demonstrating the synthesis of full-scale treatment trains A must-have designing or operating water treatment plants, Water Treatment, Third Edition is also useful for students of civil, environmental, and water resources engineering.

The book on Physico-Chemical Treatment of Wastewater and Resource Recovery provides an efficient and low-cost solution for remediation of wastewater. This book focuses on physico-chemical treatment via advanced oxidation process, adsorption, its management and recovery of valuable chemicals. It discusses treatment and recovery process for the range of pollutants inc proteins, phenols, antibiotics, complex organic compounds and metals. The occurrence of persistent pollutants poses deleterious effects on human and environmental health. Simple solutions for recovery of valuable chemicals and water during physico-chemical treatment of wastewater are discussed extensively. This book provides necessary knowledge and experimental studi chemical processes for reducing water pollution and resource recovery.

Applications of New Concepts of Physical-Chemical Wastewater Treatment deals with novel concepts of physical-chemical wastewater treatment, with particular reference to their engineering applications. Topics covered range from ultrahigh rate filtration of municipal wastewater to the applicability of carbon adsorption in the treatment of petrochemical wastewaters, along with re carbon and dewatering of physical-chemical sludges. Comprised of 31 chapters, this volume begins with a discussion on the use of physical-chemical methods for the treatment of municipal wastes and for direct wastewater treatment. The following chapters focus on the interrelationships between biological treatment and physicochemical treatment; some problems associated v by non-biological processes; treatment of wastes generated by metal finishing and engineering industries; and the principles and practice of granular carbon reactivation. The precipitation of calcium phosphate in wastewaters is also considered, together with the use of surface stirrers for ammonia desorption from ponds. This book will be a valuable resource for chemists, engine and environmental policymakers.

Drinking Water Treatment for Developing Countries

Fundamentals of Water Treatment Unit Processes

Water-1976

Principles of Water and Wastewater Treatment Processes

Applications in Water, Wastewater, and Stormwater Treatment : EWRI Computational Fluid Dynamics Task Committee

Chemical Water and Wastewater Treatment VII

Based upon half a century of research by the authors, Physical and Chemical Separation in Water and Wastewater Treatment addresses the whole water cycle spectrum, from global hydrological cycle, urban-regional metabolic cycle to individual living and production cycle, with respect to quality control technology based on fundamental science and theories. For every treatment process, basic scientific and environmental physical and chemical natures are explained with respect to those of water and its impurities. Health danger and risks for human beings are also covered. The authors define water qualities on a “Water Quality Matrix” composed of 35 elements. The vertical axis (row), has individual 7digit impurity size from 10-10m (water molecule 3?) to 10-3m (0.1mm sand grains) and in the horizontal axis(column) there are 5 categories of surrogate chemical and biochemical quality indices. The same 35 element matrix is used to correspond with several typical water quality treatments, unit-operation/unit-process, with a suitable characteristic grouping of the elements. The authors then present “the Water Quality Conversion Matrix” or “Water Quality Treatment Matrix”. With respect to typical treatment processes, the basic concept and scientific background are explained and the background of the technologies is clarified. Mechanisms of the process are explained and a kinetic process is formulated. The kinetics are experimentally verified quantitatively with important equilibrium and rate constants. Based on the authors’ research, various new treatment technologies are proposed with high efficiency, high capacity and less energy, and with steady operation ability. This comprehensive reference book is intended for undergraduate and graduate students, and also serves as a guide book for practical engineers and industry and university researchers.

Drinking water availability and safety is a major challenge faced globally and is highly pronounced in developing countries worldwide. Lack of safe potable water across the globe can be attributed to industrial pollution, climate change and other human activities that result in a spectrum of chemical, physical and biological pollutants entering a water body. Although efforts to solve this problem are well underway worldwide, challenges still exist. This book shines a light on drinking water treatment methods and scale of operation specifically for the developing countries. Covering both conventional and emerging treatment technologies, the authors discuss the removal of chemical, physical and biological pollutants from drinking water, with a focus on developing countries. Conservation by rainwater harvesting, wastewater reuse, and selection criteria of feasible methods are considered in the context of issues relevant to Africa, Asia, Latin America and the Caribbean. With case studies connecting theory to real world matters, showcasing efficiencies and drawbacks, this book is ideal for graduate and postgraduate level course use in engineering departments or for self-study and research.

Advanced Water Treatment: Advanced Oxidation Processes reviews the most recent research findings and discusses new photocatalysts (such as TiO2, etc.) and their performance under different conditions. Furthermore, the book includes the use of UV LEDs (with H2O2) for the decomposition of organic pollutants and bacteria in various conditions and water samples. Advanced oxidation processes (AOPs) have widely been used in water and wastewater treatment. This book highlights their work towards improving energy-efficient and environmentally friendly technology for growing needs in water treatment. Includes most recent research on advanced water treatment using photocatalysis Covers novel photocatalysts for water purification Presents the use of sulphide materials in water purification

Physical, Chemical, and Biological

Physical-chemical Treatment Processes

Physico-Chemical Wastewater Treatment and Resource Recovery

USA-USSR Working Group on the Prevention of Water Pollution from Municipal and Industrial Sources

Computational Fluid Dynamics

Physical-chemical Treatment Technology

Provides an excellent balance between theory and applications in the ever-evolving field of water and wastewater treatment Completely updated and expanded, this is the most current and comprehensive textbook available for the areas of water and wastewater treatment, covering the broad spectrum of technologies used in practice today—ranging from commonly used standards to the latest state of the art innovations. The book begins with the fundamentals—applied water chemistry and applied microbiology—and then goes on to cover physical, chemical, and biological unit processes. Both theory and design concepts are developed systematically, combined in a unified way, and are fully supported by comprehensive, illustrative examples. Theory and Practice of Water and Wastewater Treatment, 2nd Edition: Addresses physical/chemical treatment, as well as biological treatment, of water and wastewater Includes a discussion of new technologies, such as membrane processes for water and wastewater treatment, fixed-film biotreatment, and advanced oxidation Provides detailed coverage of the fundamentals: basic applied water chemistry and applied microbiology Fully updates chapters on analysis and constituents in water; microbiology; and disinfection Develops theory and design concepts methodically and combines them in a cohesive manner Includes a new chapter on life cycle analysis (LCA) Theory and Practice of Water and Wastewater Treatment, 2nd Edition is an important text for undergraduate and graduate level courses in water and/or wastewater treatment in Civil, Environmental, and Chemical Engineering.

Water Quality EngineeringPhysical / Chemical Treatment ProcessesJohn Wiley & Sons

This book provides an introduction, overview, and specific examples of computational fluid dynamics and their applications in the water, wastewater, and stormwater industry.

Vanderbilt University, Nashville, Tennessee September 18-22, 1972

Physical, Chemical and Biological Pollutants

Physical / Chemical Treatment Processes

From Basic Principles to Applications

Water-energy Interactions in Water Reuse

Principles and Design

This book provides useful information about bioremediation, phytoremediation, and mycoremediation of wastewater and some aspects of the chemical wastewater treatment processes, including ion exchange, neutralization, adsorption, and disinfection. Additionally, this book elucidates and illustrates the wastewater treatment plants in terms of plant sizing, plant layout, plant design, and plant location. Cutting-edge topics include wet air oxidation of aqueous wastes, biodegradation of nitroaromatic compounds, biological treatment of sanitary landfill leachate, bacterial strains for the bioremediation of olive mill wastewater, gelation of arabinoxylans from maize wastewater, and modeling wastewater evolution.

Water pollution occurs when toxic pollutants of varying kinds (organic, inorganic, radioactive and so on) are directly or indirectly discharged into water bodies without adequate treatment to remove such potential pollutants. Todays sources of these potential pollutants, which cause high deterioration of freshwater quality, are city sewage and industrial waste discharge, human agricultural practices, industrial waste disposal practices, mining activities, civil and structural work activities and obviously natural contamination with climate change. When our water is polluted, it is not only devastating to the environment but also to human health. Therefore, development of water and wastewater treatment processes to alleviate water pollution has been a challenging and demanding task for engineers, scientists and researchers. Perhaps this is even more challenging for underdeveloped and developing countries, where water and wastewater treatment facilities, knowledge and infrastructure are limited. Water and wastewater treatment processes are broad and often multidisciplinary in nature, comprising a mixture of research areas including physical, chemical and biological methods to remove or transform various potential pollutants. This is in hopes to achieve acceptable water quality and satisfy governmental and environmental protection agencies laws and regulations. With these objectives, this book has been written in order to provide various research results and compilation and up-to-date development on the current states of knowledge and techniques in the broad field of water and wastewater treatment processes. Basically, this book will give a comprehensive understanding and advancement and application of various physical, chemical and biological treatment methods in the reduction of potential pollutants (inorganics/organics) from water and wastewater. There are a total 18 book chapters contributed by large number of expert authors around the world, covering the following main research areas: Physical, chemical and biological water treatment processes such as adsorption, biosorption, coagulation/flocculation, electrocoagulation, denitration, membrane filtration/separation, photo-catalytic reduction, advanced oxidation, nutrients removal by struvite crystallisation and nanotechnology; Physical, chemical and biological methods for municipal wastewater and industrial wastewater treatment plants such as primary-secondary sludge treatments, anaerobic digestions, aerobic treatment, activated sludge processes, dewaterability by flocculants, pre-treatments of sludge and rheology of sludge in wastewater treatment; Various operational units/equipment and process control of wastewater treatment plant.

Treating potable and polluted water for the world's population is still one of our most important challenges. The United Nations estimate that more than 1.2 billion people suffer from inadequate water supply and an even larger number, up to 4 billion people, are without hygienic disposal of waste and wastewater. Water technology and the necessary "know-how transfer", has been the key objective of the Gothenburg symposia from the very beginning. The contents of this book respond to these challenges and demonstrate the impressive development of the field of chemical waster and wastewater treatment. The Chemical Water and Wastewater Treatment Series provides authoritative coverage of the key current developments in the chemical treatment of water and wastewater in theory or practice and related problems such a s sludge production and properties, and the reuse of chemicals and chemically-treated waters and sludges. For the tenth in the series, the contributions document the development if the field of chemical water and wastewater technology, both in terms of new technological developments as well as public and administrative acceptance and approval of the solutions offered. Such new developments include the use of membrane technology, the application of computational tools for kinetic process modelling and optimisation as well as the use of advanced oxidation processes in actual water treatment. Chemical Water and Wastewater Treatment VII covers fundamental science, new technological developments and practical experience and is an invaluable reference source for engineers scientists and administrators, active in the treatment of drinking water, municipal and industrial wastewater and sludges.

Physical, chemical wastewater treatment

Water

Physical Chemical and Biological Treatment Processes for Water and Wastewater

An Applied Guide to Water and Effluent Treatment Plant Design

Chemistry of Ozone in Water and Wastewater Treatment

Tackling the issue of water and wastewater treatment nowadays requires novel approaches to ensure that sustainable development can be achieved. Water and wastewater treatment should not be seen only as an end-of-pipe solution but instead the approach should be more holistic and lead to a more sustainable process. This requires the integration of various methods/processes to obtain the most optimized design. Integrated and Hybrid Process Technology for Water and Wastewater Treatment discusses the state-of-the-art development in integrated and hybrid treatment processes and their applications to the treatment of a vast variety of water and wastewater sources. The approaches taken in this book are categorized as (i) resources recovery and consumption, (ii) optimal performance, (iii) physical and environmental footprints, (iv) zero liquid discharge concept and are (v) regulation-driven. Through these categories, readers will see how such an approach could benefit the water and wastewater industry. Each chapter discusses challenges and prospects of an integrated treatment process in achieving sustainable development. This book serves as a platform to provide ideas and to bridge the gap between laboratory-scale research and practical industry application. Includes comprehensive coverage on integrated and hybrid technology for water and wastewater treatment Takes a new approach in looking at how water and wastewater treatment contributes to sustainable development Provides future direction of research in sustainable water and wastewater treatment

Water-Energy Interactions of Water Reuse covers the use of energy in conventional and advanced wastewater treatment for various water reuse applications, including carbon footprint, energy efficiency, energy self-sufficient facilities and novel technologi