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Deals with Waste
How Man Deals with Waste
The Role of Organisms
Fixed-Film Reactors
Activated Sludge
Natural Treatment Systems
Anaerobic Unit Processes
Sludge Treatment and Disposal
Public Health
Biotechnology and Wastewater Treatment
Environmental Management

Biological Wastewater Treatment: Principles, Model

This comprehensive text provides the reader with both a detailed reference and a unified course on wastewater treatment. Aimed at scientists and engineers, it deals with the environmental and biological aspects of wastewater treatment and sludge disposal. The book starts by examining the nature of wastewaters and how they are oxidized in the natural environment. An introductory chapter deals with wastewater treatment systems and examines how natural principles have been harnessed by man to treat his own waste in specialist reactors. The role of organisms is considered by looking at kinetics, metabolism and the different types of micro-organisms involved. All the major biological process groups are examined in detail, in highly referenced chapters; they include fixed film reactors, activated sludge, stabilization ponds, anaerobic systems and vegetative processes. Sludge treatment and disposal is examined with particular reference to the environmental problems associated with the various disposal routes. A comprehensive chapter on public health looks at the important waterborne organisms associated with disease, as well as removal processes within treatment systems. Biotechnology has had an enormous impact on wastewater treatment at every level, and this is explored in terms of resource reuse, biological conversion processes and environmental protection. Finally, there is a short concluding chapter that looks at the sustainability of waste water treatment. The text is fully illustrated and supported by over 3000 references. Contents:How Nature Deals with Waste
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Essential reading for chemists, engineers, microbiologists, environmental scientists, and environmental agencies. 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 aromatic compounds, biological treatment of sanitary landfill leachate, bacterial strains for the bioremediation of olive mill wastewater, gelation of arabinofuranosyl from maize wastewater, and modeling wastewater evolution.

Wastewater Treatment Engineering - Mohamed Samer - 2015-10-14

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Wastewater Treatment in Warm Climate Regions - Marcos Von Sperling - 2005-09-30

Biological Wastewater Treatment in Warm Climate Regions gives a state-of-the-art presentation of the science and technology of biological wastewater treatment, particularly domestic sewage. The book covers the main treatment processes used worldwide with wastewater treatment in warm climate regions given a particular emphasis where simple, affordable and sustainable solutions are required. This comprehensive book presents in a clear and informative way the basic principles of biological wastewater treatment, including theory and practice, and covering conception, design and operation. In order to ensure the practical and didactic view of the book, 371 illustrations, 322 summary tables and 117 examples are included. All major wastewater treatment processes are covered by full and interlinked design examples which are built up throughout the book, from the determination of wastewater characteristics, the impact of discharge into rivers and lakes, the design of several wastewater treatment processes and the design of sludge treatment and disposal units. The 55 chapters are divided into 7 parts over two volumes: Volume One: (1) Introduction to wastewater characteristics, treatment and disposal; (2) Basic principles of wastewater treatment; (3) Anaerobic reactors; Volume Two: (5) Activated sludge; (6) Aerobic biofilm reactors; (7) Sludge treatment and disposal. As well as being an ideal textbook, Biological Wastewater Treatment in Warm Climate Regions is an important reference for practising professionals such as engineers, biologists, chemists and environmental scientists, acting in consulting companies, water authorities and environmental agencies.

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Biology of Sewage Treatment and Water Pollution Control - Mohamed Samer - 2015-10-14

This concise introduction to the fundamentals of biological treatment of wastewaters describes how to model and integrate biological steps into industrial processes. The book first covers the chemical, physical and biological basics, including wastewater characteristics, microbial metabolism, determining stoichiometric equations for catabolism and anabolism, measurements of mass transfer and respiration rates and the aerobic treatment of wastewater loaded with dissolved organics. If the moves on to deal with such applications and technologies as nitrogen and phosphorus removal, membrane technology, the assessment and selection of aeration systems, simple models for biofilm reactors and the modeling of activated sludge processes. A final section looks at the processing of water and the treatment of wastewater integrated into the production process.
Compactness and high efficiency. It also includes a chapter dedicated to both of which are finding increasing application worldwide thanks to their potential for large-scale application in the near future. It also explores the in detail and presents the state-of-the-art in this field and the opportunities these techniques offer to improve process performance.

**Biological Wastewater Treatment and Resource Recovery** - Robina Farooq - 2017-03-29

Biological treatment of wastewater is a low-cost solution for remediation of wastewater. This book focuses on the bioremediation of wastewater, its management, monitoring, role of biomimics on wastewater treatment and energy recovery. It emphasizes on organic, inorganic and micropollutants entering into the environment after conventional wastewater treatment facilities of industrial, agricultural and domestic wastewaters. The occurrence of persistent pollutants poses deleterious effects on human and environmental health. Simple solution for recovery of energy as well as water during biological treatment of wastewater is a viable option. This book provides necessary knowledge and experimental studies on emerging bioremediation processes for reducing water, air and soil pollution.

**Wastewater Characteristics, Treatment and Disposal** - Marcos Von Sperling - 2007-03-30

Wastewater Characteristics, Treatment and Disposal is the first volume in the series Biological Wastewater Treatment, presenting an integrated view of water quality and wastewater treatment. The book covers the following topics: wastewater characteristics (flow and major constituents) impact of wastewater discharges to rivers and lakes overview of wastewater treatment. Other titles in the series are: Volume 2: Basic Principles of Wastewater Treatment; Volume 3: Waste Stabilisation Ponds; Volume 4: Anaerobic Reactors; Volume 5: Activated Sludge and Aerobic Biofilm Reactors; Volume 6: Sludge Treatment and Disposal

**Microbial Ecology of Wastewater Treatment Plants** - Maulin P. Shah - 2021-05-15

Microbial Ecology of Wastewater Treatment Plants presents different methods and techniques used in microbial ecology to study the interactions and evolution of microbial populations in WWTPs, particularly the new
of performance and cost effectiveness Discusses cutting-edge molecular based methods (e.g. studies of DNA, RNA and proteins) provide a high resolution of information compared to traditional ways of studying microbial wastewater populations, such as microscopic examination and culture-based methods. In addition, this book addresses the ability of microorganisms to degrade environmental pollutants. Describes application of different Omics tools in Wastewater treatment plants (WWTPs) Demonstrates the role of microorganisms in WWTPs Includes discussions on the microbial ecology of WWTPs Covers the microbial diversity of activated sludge Emphasizes cutting-edge molecular tools

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Biology of Wastewater Treatment - N. F. Gray - 1989
Aimed primarily at natural scientists, this text provides a unified course in wastewater treatment. It deals with the environmental and biological aspects of wastewater treatment and disposal, as well as the fundamental physical and chemical principles of treatment.

Biological Treatment of Industrial Wastewater: - Maulin P. Shah - 2021-12-03
Biological Treatment of Industrial Wastewater presents a comprehensive overview of the latest advances and trends in the use of bioreactors for treating industrial wastewater.

Kinetics of Wastewater Treatment - S. H. Jenkins - 2013-10-22
Kinetics of Wastewater Treatment contains the proceedings of a post-conference seminar held at the Technical University of Denmark, Copenhagen in 1978. Separating 10 papers presented in the seminar as chapters, this book begins with the conceptual basis of calcium phosphate precipitation in a denitrifying biofilm. The influence of pH and calcium ions upon phosphorus transformations in biological wastewater treatment plants; sewage treatment by activated sludge; orthokinetic flocculation of phosphate precipitates in a multicomponent reactor with non-ideal flow; and kinetics of phosphorus transformations in aerobic and anaerobic environments are then described. This text also looks into the chemical floc formation in wastewater treatment; temperature dependency of microbial reactions; the influence of some environmental factors on floc kinetics; kinetics of biological flocs; and two step precipitation of calcium phosphates.

Sludge Treatment and Disposal - Cleverson Vitorio Andreoli - 2007-03-30
Sludge Treatment and Disposal is the sixth volume in the series Biological Wastewater Treatment. The book covers in a clear and informative way the sludge characteristics, production, treatment (thickening, dewatering, stabilisation, pathogens removal) and disposal (land application for agricultural purposes, sanitary landfills, landfarming and other methods). Environmental and public health issues are also fully described. About the series: The series is based on a highly acclaimed set of best selling textbooks. This international version is comprised by six textbooks giving a state-of-the-art presentation of the science and technology of biological wastewater treatment. Other titles in the series are: Volume 1: Waste Stabilisation Ponds; Volume 2: Basic Principles of Wastewater Treatment; Volume 3: Waste Stabilisation Ponds; Volume 4: Anaerobic Reactors; Volume 5: Activated Sludge and Aerobic Biofilm Reactors

The Future of Effluent Treatment Plants - Maulin P. Shah - 2021-05-24
The Future of Effluent Treatment Plants: Biological Treatment Systems is an advanced and updated version of existing biological technologies that includes their limitations, challenges, and potential application to remove biological tools Gives in-depth knowledge to study microbial community structure and function in wastewater treatment reactors

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Anaerobic Sewage Treatment: Optimization of Process and Physical Design biochemical oxygen demand (BOD), color removal and environmental pollutants through bioremediation in microbially driven reactors. The book introduces new trends and advances in environmental bioremediation with thorough discussions of recent developments. In addition, it illustrates that the application of these new emerging innovative technologies can lead to energy savings and resource recovery. The importance of respiration, nitrogen mineralization, nitrification, denitrification and biological phosphorus removal processes in the development of a fruitful and applicable solution for the removal of toxic pollutants from wastewater treatment plants is highlighted. Equally important is the knowledge and theoretical modeling of water movement through wastewater ecosystems. Finally, emphasis is given to the function of constructed wetlands and activated sludge processes. Consider different types of industrial wastewater treatment strategies on biological wastewater treatments. Introduces new trends in bioremediation Addresses the future of WWTPs

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Activated Carbon for Water and Wastewater Treatment - Ferhan Cecen - 2011-09-19

This monograph provides comprehensive coverage of technologies which integrate adsorption and biological processes in water and wastewater treatment. The authors provide both an introduction to the topic as well as a detailed discussion of theoretical and practical considerations. After a review of the basics involved in the chemistry, biology and technology of integrated adsorption and biological removal, they discuss the setup of pilot- and full-scale treatment facilities, and the factors that influence the successful operation of integrated systems. Their discussion on integrated systems expands from the effects of environmental to the removal of various pollutants, to regeneration of activated carbon, and to the analysis of such systems in mathematical terms. The authors conclude with a look at future needs for research and development. A truly valuable resource for environmental engineers, environmental and water chemists, as well as professionals working in water and wastewater treatment.

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Biofilms in Wastewater Treatment - Stefan Wurz - 2003

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Anaerobic Sewage Treatment - Jeroen van der Lubbe - 2019-08-15

Anaerobic Sewage Treatment: Optimization of Process and Physical Design of Anaerobic and Complementary Processes focuses on process design and deals with start-up procedures and steady state performance of UASB reactors, as well as the influence of operation on reactor performance.

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Wastewater Treatment - Maulin P. Shah - 2021-01-30
Wastewater Treatment: Cutting-Edge Molecular Tools, Techniques and Applied Aspects reports new findings in existing molecular biology strategies, including their limitations, challenges and potential application to remove environmental pollutants through advancements made in cutting edge tools. In addition, the book introduces new trends and advances in environmental bioremediation with thorough discussions on recent developments in this field. Describes the application of different omics tools in wastewater treatment plants (WWTPs) Describes the role of microorganisms in WWTPs Points out the reuse of treated wastewater through emerging technologies Includes the recovery of resources from wastewater Emphasizes the need for the use of cutting-edge molecular tools

Biological Wastewater Treatment Systems - Nigel Horan - 1990-02-02
Presents a microbiological perspective on the design and operation of wastewater treatment systems. Covers the fundamentals of microbiology, aspects of chemical engineering, operation and modification of wastewater treatment plants. Emphasis is on the activated-sludge process. Each chapter contains worked examples, review questions and a bibliography.

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Nano and Bio-Based Technologies for Wastewater Treatment - Elvis Fosso-Kankeu - 2019-05-21
Over the past few decades the boom in the industrial sector has contributed to the release in the environment of pollutants that have regulatory status and which may have significant impact on the health of animals and humans. These pollutants also refer as “emerging pollutants” are mostly aromatic compounds which derive from excretion of pharmaceutical, industrial effluents and municipal discharge. Some form of pollutants have also evolved, including the proliferation of acid mine drainage from oxidizing or weathering of obsolete and unmanaged excavations around the world; this results mostly in the dispersion of inorganic pollutants in the environment at level surpassing the treatment capacity of conventional techniques. It is recurrent these days to find water treatment plants which no longer produce water that fits the purpose of domestic consumption based on newly established guidelines. This situation has prompted water authorities and researchers to develop tools for water prediction and control of the dispersion of pollutants in the environment to ensure that appropriate measures are taken to prevent the occurrence of outbreaks due to sudden load of these pollutants in the water system. The chapters in this book cover a wide range of nano and bio-based techniques that have been designed for the real time detection of emerging contaminants in environmental water sources, geochemical models that are continuously improved for the prediction of inorganic contaminants migration from the mine solid wastes into ground and surface waters. Remediation strategies are also discussed and include effective techniques based on nanotechnology, advanced membrane filtration, oxidative and biodegradation processes using various types of nanocatalysts, biocatalysts or supporting polymer matrices which are under advanced investigations for their implementation at large scale for the removal of recalcitrant pollutants from polluted water. This book is divided is two sections, the first section covers the occurrence of emerging pollutants in environmental water while the second section covers state of the art research on the removal of emerging pollutants from water using sustainable technologies. A total of 13 chapters addressing various topics related to the two sections are essentially based on recent development in the respective field which could have a significant impact on the enhancement of the performance of wastewater treatment plants around the world and especially in developing countries where access to clean and safe water remains a daily challenge.

Activated Sludge and Aerobic Biofilm Reactors - Marcos von Sperling - 2007-01
The first part of the book is devoted to the activated sludge process, covering the removal of organic matter, nitrogen and phosphorus. A detailed analysis of the biological reactor (aeration tank) and the final sedimentation tanks is provided. The second part of the book covers aerobic biofilm reactors, especially trickling filters, rotating biological contractors and submerged aerated biofilters. For all the systems, the book presents in a clear and informative way the main concepts, working principles, expected removal efficiencies, design criteria, design examples, construction aspects and operational guidelines.

Wastewater Treatment Systems - Gerd Olson - 1999-05-31
This is a book for those contemplating or studying biological wastewater treatment plants. It introduces the state-of-the-art in process systems.
treatment with the aim of reducing the volume of sewage sludge. Provides a control and instrumentation) and in particular its application to wastewater treatment. While the emphasis is on biological nutrient removal, there is discussion of anaerobic treatment, and the principles apply to any treatment process. For the computer literate there is also a collection of MATLAB programs and functions that are mentioned throughout the book. They will run on both the professional and student editions of MATLAB Version 5. Contents Modelling Plant Dynamics, Basic Modelling, Advanced Modelling Empirical or Black-Box Models, Experiments and Data Screening, Principles of Parameter Estimation, Fitting and Validating Models, Simulators Diagnosis - an Introduction, Quality Management, Model Based Diagnosis, Knowledge Based Systems Control Goals and Strategies, Disturbances Manipulated Variables, Feedback Control, Model Based Control, Batch Plant Control, Plant Wide Control, Benefit Studies Instrumentation Primary Sensors, Analysers Actuators and Controllers The Future Wastewater Treatment Systems - Gustaf Olsson - 1999-05-31 This is a book for those designing and studying biological wastewater treatment plants. It introduces the state-of-the-art in process systems analysis (modelling and simulation, monitoring and diagnosis, process control and instrumentation) and in particular its application to wastewater treatment. While the emphasis is on biological nutrient removal, there is discussion of anaerobic treatment, and the principles apply to any treatment process. For the computer literate there is also a collection of MATLAB programs and functions that are mentioned throughout the book. They will run on both the professional and student editions of MATLAB Version 5. 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As the demand for wastewater treatment, recycling and re-use technologies increases, it is envisaged that the membrane separation bioreactor will corner the market. Contents Membrane Fundamentals Biological Fundamentals Biomass Separation Membrane Bioreactors Membrane Aeration and Extractive Bioreactors Commercial Membrane Bioreactor Systems Membrane Bioreactor Applications Case Studies Membrane Bioreactors for Wastewater Treatment - Thomas Stephenson - 2000-05-31 The book covers the subject of membrane bioreactors (MBR) for wastewater treatment, dealing with municipal as well as industrial wastewaters. The book details the 3 types of MBR available and discusses the science behind the technology, their design features, operation, applications, advantages, limitations, performance, current research activities and cost. As the demand for wastewater treatment, recycling and re-use technologies increases, it is envisaged that the membrane separation bioreactor will corner the market. Contents Membrane Fundamentals Biological Fundamentals Biomass Separation Membrane Bioreactors Membrane Aeration and Extractive Bioreactors Commercial Membrane Bioreactor Systems Membrane Bioreactor Applications Case Studies Advanced Biological, Physical, and Chemical Treatment of Waste Activated Sludge - Antoine Prandota Trzcinski - 2018-11-02 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. This book provides an overview of advanced biological, physical and chemical 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 Advanced Biological, Physical, and Chemical Treatment of Waste Activated Sludge - Antoine Prandota Trzcinski - 2018-11-02 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. 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Offers data from pilot scale experience of these processes Advances in Wastewater Treatment - Giorgio Mannina - 2018-10-15 Advances in Wastewater Treatment presents a compendium of the key topics surrounding wastewater treatment, assembled by looking at the future technologies, and provides future perspectives in wastewater treatment and modelling. It covers the fundamentals and innovative wastewater treatment processes (such as membrane bioreactors and granular processes). Furthermore, it focuses attention on mathematical modelling aspects in the field of wastewater treatments by highlighting the key role of models in process design, operation and control. Other topics include: • Anaerobic digestion • Biological nutrient removal • Instrumentation, control and automation • Computational fluid dynamics in wastewater • IFAS systems • New frontiers in wastewater treatment • Greenhouse gas emissions from wastewater treatment Each topic is addressed by discussing past, present and future trends. Advances in Wastewater Treatment is a valid support for researchers, practitioners and also students to have a frame of the frontiers in wastewater treatment and modelling. Advances in Wastewater Treatment - Giorgio Mannina - 2018-10-15 Advances in Wastewater Treatment presents a compendium of the key topics surrounding wastewater treatment, assembled by looking at the future technologies, and provides future perspectives in wastewater treatment and modelling. It covers the fundamentals and innovative wastewater treatment processes (such as membrane bioreactors and granular process). 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Its focus is on both novel treatment strategies and the modifications and adoptions of conventional processes to optimize the treatment of a complex variety of pollutants, including organic matter, chemicals and micropollutants in different water resources, as well as the integration of water treatment with bioelectricity production. Written by leading researchers in the field, it will be of interest to a wide range of researchers in both industry and academia.
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**Treatment Wetlands** - Gabriela Dotro - 2017-11-15

Contents: Overview of Treatment Wetlands; Fundamentals of Treatment Wetlands; Horizontal Flow Wetlands; Vertical Flow Wetlands; French Vertical Flow Wetlands; Intensified and Modified Wetlands; Free Water Surface Wetlands; Other Applications; Additional Aspects.

**Environmental Biotechnology** - Hans-Joachim Jördening - 2006-03-06

A deeper insight into the complex processes involved in this field, covering the biological, chemical and engineering fundamentals needed to further develop effective methodologies. The book devotes detailed chapters to each of the four main areas of environmental biotechnology – wastewater treatment, soil treatment, solid waste treatment, and waste gas treatment – dealing with both the microbiological and process engineering aspects. The result is the combined knowledge contained in the extremely successful volumes 11a through 11c of the "Biotechnology" series in a handy and compact form.

**Anaerobic Waste-Wastewater Treatment and Biogas Plants** - Joseph Chukwuemeka Akunna - 2018-07-16

The book guides specialists and non-specialists from around the world on how or whether anaerobic processes can be part of solutions for the management of municipal and industrial solid, semi-solid, and liquid residues. The simple self-learning presentation style is designed to encourage deep understanding of the process principles, plant types and system configurations, performance capabilities, operational and maintenance requirements, post-treatment needs, and management options for coproducts without complex biochemical terminologies and equations. It describes key aerobic biological treatment processes used in conjunction with anaerobic biological treatment in feedstock pre-treatment and in post-treatment of by-products. Practical pre-treatment processes, techniques and operations are described alongside additional treatment techniques of biogas, digestates and treated effluents for various end use options. Effective applications in developing countries are also considered, enabling practitioners and plant operators to effectively apply technology in temperate and warm climatic conditions.