

# Biological Wastewater Treatment

Principles, Modelling and Design

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# Preface

Over the past twenty years, the knowledge and understanding of wastewater treatment has advanced extensively and moved away from empirically-based approaches to a fundamentally-based ‘first principles’ approach embracing chemistry, microbiology, physical and bioprocess engineering, and mathematics. Many of these advances have matured to the degree that they have been codified into mathematical models for simulation by computers. For a new generation of young scientists and engineers entering the wastewater treatment profession, the quantity, complexity and diversity of these new developments can be overwhelming, particularly in developing countries where access is not readily available to advanced level courses in wastewater treatment. This book seeks to address that deficiency. It assembles and integrates the postgraduate course material of a dozen or so professors from research groups around the world that have made significant contributions to the advances in wastewater treatment.

The book forms part of an internet-based curriculum in wastewater treatment and, as such, may also be used together with lecture handouts, filmed lectures by the author professors and tutorial exercises for students’ self-study. Upon completion of this curriculum, the modern approach of modelling and simulation to wastewater treatment plant design and operation - be it activated sludge, biological nitrogen and phosphorus removal, secondary settling tanks or biofilm systems - can be embraced with deeper insight, advanced knowledge and greater confidence.

This book and innovative learning materials were produced under the framework of the UNESCO-IHE Partnership for Water Education and Research (PoWER). PoWER develops and provides demand-responsive and duly accredited postgraduate education, joint research and capacity building services to individuals and organizations throughout the developing world.

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Further, we acknowledge the contributors who allowed their data, images and photographs to be used in this book.

Finally, the editors wish you a beneficial study of biological wastewater treatment and its successful use in improving sanitation worldwide.

*Editors*





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