

# About the book and online course

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, and physical and bioprocess engineering, often involving experimental laboratory work and techniques. Many of these experimental methods and techniques have matured to the degree that they have been accepted as reliable tools in wastewater treatment research and practice. For sector professionals, especially the 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 to advanced level laboratory courses in wastewater treatment is not readily available. In addition, information on innovative experimental methods is scattered across scientific literature and only partially available in the form of textbooks or guidelines. This book seeks to address these deficiencies. It assembles and integrates the innovative experimental methods developed by research groups and practitioners around the world and broadly applied in wastewater treatment research and practice.

Experimental Methods in Wastewater Treatment book forms part of the internet-based curriculum in sanitary engineering at UNESCO-IHE and, as such, may also be used together with video recordings of methods and approaches performed and narrated by the authors, including guidelines on best experimental practices. The book is written for undergraduate and postgraduate students, researchers, laboratory staff, plant operators, consultants, and other sector professionals.

The idea of making this book and the online learning course was conceived in 2009 when UNESCO-IHE agreed to utilize some of the programmatic funds provided by the Dutch Ministry of Foreign Affairs to develop innovative learning methods and products. However it took until 2011 to acquire the additional funds from the Bill & Melinda Gates Foundation (BMGF) that enabled the original idea to be fully executed. The conceptual framework for the book, and the online course that it is part of, was agreed upon in Montreal during the IWA World Water Congress and Exhibition in September 2010 and further detailed during the IWA event in Essen, Activated Sludge – 100 Years and Counting. The latter was the occasion when the concept was introduced of also having established reviewers in the

field to provide critical feedback on the manuscripts and improve the quality of the final product, in addition to the esteemed groups of experts writing the chapters of the book. Besides providing chapters in the book, authors were requested to prepare presentation slides, tutorial exercises and to deliver scenarios and narration for video-recorded lectures and execution of experimental procedures at UNESCO-IHE and partner laboratories. These materials have been compiled into a digital package available to those registered for the online course. IWA Publishing has agreed to publish the book and market both the book and online learning course. It has also been agreed that the book and online course digital materials are available free of charge. The online course is delivered once or twice a year depending on the demand (please consult the UNESCO-IHE website for further information on how to embark on the course or download the course materials). The book is also used for teaching as part of a lecture series in the Sanitary Engineering specialization of the UNESCO-IHE's Master's Program in Urban Water and Sanitation. It is conceptualized in such a way that it can be used as a self-contained textbook or as an integral part of the online learning course.

A number of individuals deserve to be singled out as their support was crucial in this development and is highly appreciated: Dr. Roshan Shrestha, Dr. Doulaye Koné, Dr. Frank Rijsberman and Dr. Brian Arbogast (BMGF), and Dr. Wim Duven and Jetze Heun (UNESCO-IHE). The book was edited by Peter Stroo, Hans Emeis, Claire Taylor, Michelle Jones, and Maggie Smith. The credit for the content goes to all the authors, reviewers and enthusiastic group of editors. Further, I acknowledge the contributors who allowed their data, images and photographs to be used in this book and the course.

Finally, I hope that this book and the training materials will be useful in your research or practical work, be it at a laboratory-, pilot- or full-scale wastewater treatment plant.

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