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Book review

Environmental Engineering: Principles and Practice By Richard O. Mines, Jr.

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Book details

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Review

The Environmental engineering is the integration of science and engineering principles to improve the natural environment, to provide healthy water, air, and land for human habitation and for other organisms, and to clean up pollution sites. This definition, coined in Wikipedia, perfectly summarizes the contents to be provided in this book.

This title *Environmental Engineering: Principles and Practice* suggests that the book is mainly meant for practitioners, desiring to refresh or enlarge their theoretical basis and to find important information as well as handy hints, for further use in daily practice. Practicing engineers may find this book a valuable resource for self-study, yet would regret that the contents of this manual remain forcibly basic and are not comprehensive or dealing with actual practice. Indeed, the book is specially written as a textbook for advanced U.S. undergraduate and first-semester graduate courses on the title subject.

The book is composed of twelve chapters devoted to the following topics (number of pages, % of the total of 637 active pages):

1. Introduction to environmental engineering and problem solving (42 pp. or 7 %).
2. Essential chemistry concepts (60 pp. or 9 %).
3. Water and wastewater characteristics (36 pp. or 6 %).
4. Essential biology concepts (56 pp. or 9 %).
5. Environmental systems: modeling and reactor design (44 pp. or 7 %).
6. Design of water treatment systems (92 pp. or 14 %).
7. Design of wastewater treatment systems (118 pp. or 19 %).
8. Municipal solid waste management (30 pp. or 5 %).
9. Air pollution (40 pp. or 6 %).
10. Environmental sustainability (36 pp. or 6 %).
11. Environmental public health (40 pp. or 6 %).
12. Hazardous waste management (19 pp. or 3 %).
13. Table of Mendeleev and Index (21 pp. or 3 %).

There is also a dedicated website with illustrations, problems and solutions. Richard O. Mines, Jr. signed the chapters 2 to 7. Other authors include A. J. Butler (Chapter 1), Dr. P. T. McCreanor (Chapter 8), A. B. Nunn (Chapter 9), Dr. J.C. Little and Dr. Zhe Liu (Chapter 10), Dr. P. Vikesland (Chap-

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ter 11), and Dr. J. T. and P.J. Novak (Chapter 12). Most authors belong either to Mercer University, Macon, GA, or Virginia Tech, Blacksburg, VA, USA.

Each chapter starts with synthetic *Learning Objectives* the reader is to be faced with. Then, some theoretical principles are introduced and soon supported by numerous examples illustrating either the theory or a design approach through problems and examples selected carefully to facilitate understanding. Each chapter is also followed by a summary, keywords, references, and problems to try and solve. Those reading the book for purposes of self-study will be comforted to find the model solutions on a companion website, which also supplies all Figures and Tables provided in the Textbook. This underlines once more the emphasis on the supporting function for teachers in environmental technology.

It is difficult to judge the respective contents, selected for presentation in this textbook. Obviously, it is impossible to present all aspects of physics, chemistry, mathematics and problem solving comprehensively in a single volume of this size. Still, some qualities and parts are highly appreciated, such as the clear and concise presentation of facts, formulas, and definitions. Quite useful is the discussion on data collection, analysis, interpretation and communication, which not only tells the reader what environmental data is about and how to use tables, figures, regression, ANOVA, etc. in less than half of Chapter 1. Other parts are more likely to be too brief, or not to the point, should the reader be a non-American teacher: the Environment is still a Legislation-driven business and the legal scope, content and context distinct, depending whether you live in the USA, the E.U., Japan or elsewhere. This reserve particularly applies to the parts on (hazardous) waste management. The basic concern and leading theme in the book is, in fact, water treatment. If your main interest is in another field, e.g., Air Pollution and its links with combustion or industrial processes, then you will find the relevant chapter restricted to basics, somewhat limited and disappointing. Emphasis is on education, on principles and how to apply these and not on describing the State of the Art.

In summary, this textbook on *Environmental Engineering: Principles and Practice* can be recommended to all teachers with responsibility in environmental engineering. It focuses upon problem solving, introducing statistical analysis, examples with US and SI units, water and wastewater treatment design, sustainability, public health. It offers all major topics of an US environmental engineering curriculum with clear preference for wide-ranging knowledge on the one hand, water treatment on the other. There is no reference to law or practice outside the US. Emphasis is on the compartment and treatment of water.

Students pursuing the civil and environmental engineering curriculum will benefit from the emphasis on practical applications in this book. This applies somewhat less on chemical and mechanical engineering. The text treats numerous environmental concepts of interest, especially those related on water and wastewater treatment and sustainability.