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Biological Process Engineering: An Analogical Approach to Fluid Flow, Heat Transfer, and Mass Transfer Applied to Biological Systems

Arthur T. Johnson

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A unique, accessible guide to the application of engineering methods to biological systems.

Presenting for the first time a practical, design-oriented, interdisciplinary approach to transport phenomena involving biological systems, Biological Process Engineering emphasizes the common aspects of the three main transport processes-fluid flow, heat transfer, and mass transfer. In clear and simple terms, it explores the relevance of these processes to broadly defined biological systems such as the growth of microbes in bioreactors, the leaching of pollutants into groundwater, and the chemistry of food manufacturing. Reaching well beyond standard applications in medicine and the environment to areas of biotechnology, aquaculture, agriculture, and food processing, this book promotes analogical thinking that will lead to creative solutions. While keeping the mathematics to a minimum, it explains principles of effective system modeling and demonstrates a wide variety of problem-solving techniques. Readers will find:
* Systems diagrams comparing and contrasting different transport processes
* Biological examples for all types of systems, including metabolic pathways, locomotion, reproduction, responses to thermal conditions, and more
* Numerous design charts and procedures
* An extensive collection of tables of parameter values, not found in any other text.

An ideal undergraduate text for biological engineering students taking courses in transport processes, Biological Process Engineering is also an excellent reference for practicing engineers. It introduces the reader to diverse biological phenomena, serves as a stepping-stone to more theoretical topics, and provides important insights into the fast-growing arena of biological engineering.

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