



Chronobioengineering: Introduction to Biological Rhythms with Applications, Volume 1 (Paperback)

By Donald McEachron

Morgan Claypool Publishers, United States, 2012. Paperback. Condition: New. Language: English . Brand New Book ***** Print on Demand *****. This book represents the first in a two-volume set on biological rhythms. This volume focuses on supporting the claim that biological rhythms are universal and essential characteristics of living organisms, critical for proper functioning of any living system. The author begins by examining the potential reasons for the evolution of biological rhythms: (1) the need for complex, goal-oriented devices to control the timing of their activities; (2) the inherent tendency of feedback control systems to oscillate; and (3) the existence of stable and powerful geophysical cycles to which all organisms must adapt. To investigate the second reason, the author enlists the help of biomedical engineering students to develop mathematical models of various biological systems. One such model involves a typical endocrine feedback system. By adjusting various model parameters, it was found that creating an oscillation in any component of the model generated a rhythmic cascade that made the entire system oscillate. This same approach was used to show how daily light/dark cycles could cascade rhythmic patterns throughout ecosystems and within organisms. Following up on these results, the author discusses how the twin...



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