

1. Record Nr.	UNINA9910427691603321
Autore	Parke William C
Titolo	Biophysics : A Student's Guide to the Physics of the Life Sciences and Medicine / / by William C. Parke
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2020
ISBN	3-030-44146-6
Edizione	[1st ed. 2020.]
Descrizione fisica	1 online resource (XVIII, 695 p. 148 illus., 90 illus. in color.)
Disciplina	571.4
Soggetti	Biophysics Biological physics Life sciences Biomedical engineering Biotechnology Biomathematics Biological and Medical Physics, Biophysics Life Sciences, general Biomedical Engineering and Bioengineering Physiological, Cellular and Medical Topics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Chapter1: Introduction: The Nature of Biophysics -- Chapter2: The Kinds of Ordinary Materials -- Chapter3: Mechanical Aspects of Biosystems -- Chapter4: Fluid Mechanics Applied to Biosystems -- Chapter5: Acoustics in Biology and Medicine -- Chapter6: Electric and Magnetic Fields in Life -- Chapter7: Light in Biology and Medicine -- Chapter8: Ionizing Radiation and Life -- Chapter9: Bioenergetics -- Chapter10: The Statistical Basis of Bioenergetics -- Chapter11: Biomolecular Structure and Interactions -- Chapter12: Entropy and Information in Biology -- Chapter13: Modeling Biological Systems -- Chapter14: Neural Networks and Brains -- Chapter15: Ordering Theory -- Chapter16: Energy Flow in the Production of Order -- Chapter17: Life in the Universe -- Chapter18: Future Developments.

Sommario/riassunto

This comprehensive and extensively classroom-tested biophysics textbook is a complete introduction to the physical principles underlying biological processes and their applications to the life sciences and medicine. The foundations of natural processes are placed on a firm footing before showing how their consequences can be explored in a wide range of biosystems. The goal is to develop the readers' intuition, understanding, and facility for creative analysis that are frequently required to grapple with problems involving complex living organisms. Topics cover all scales, encompassing the application of statics, fluid dynamics, acoustics, electromagnetism, light, radiation physics, thermodynamics, statistical physics, quantum biophysics, and theories of information, ordering, and evolutionary optimization to biological processes and bio-relevant technological implementations. Sound modeling principles are emphasized throughout, placing all the concepts within a rigorous framework. With numerous worked examples and exercises to test and enhance the reader's understanding, this book can be used as a textbook for physics graduate students and as a supplementary text for a range of premedical, biomedical, and biophysics courses at the undergraduate and graduate levels. It will also be a useful reference for biologists, physicists, medical researchers, and medical device engineers who want to work from first principles.
