Journal of Biomechanical Engineering

Book Reviews

Handbook of Bioengineering, Richard Skalak and Shu Chien, Editors, McGraw-Hill Book Company, 1987.

Reviewed by R. E. Mates

The *Handbook of Bioengineering* is an attempt to assemble, in a single volume, current reviews of the major topics of interest in bioengineering. The handbook comprises 41 chapters, each authored by recognized authorities in the subject. The Table of Contents is appended to this review.

The choice of subject matter for such a volume is difficult and inevitably reflects the interests of the editors. The emphasis in the Handbook is on biomechanics, and coverage of the mechanics of hard and soft tissues, cardiovacular, pulmonary and orthopedic mechanics is thorough and complete. In addition to these topics, the Handbook includes less familiar applications such as cochlear, uterine and vestibular mechanics.

This is not to imply that coverage is limited to biomechanical topics. There are several chapters devoted to artificial organs, measurement techniques and other topics not related to mechanics. Here, however, the range of topics is not as comprehensive. With respect to experimental and diagnostic measurements, for example, there are chapters on computerized tomography, blood pressure and flow measurements, and pulmonary function tests. There is minimal coverage of the use of ultrasound in medicine, and no discussion of the newer imaging techniques such as magnetic resonance imaging and positron emission tomography. Similarly, the field of rehabilitation engineering and aids to the handicapped are not included.

Most of the authors have provided comprehensive reviews and extensive bibliographies. In a few cases, the reviews tend to be concentrated on the authors' own work. The thoroughness of coverage of the material varies among the individual chapters. Many of the chapters contain extensive tabulations of published experimental data, while others are largely theoretical developments. For example, the chapter "Static Elastic Properties of Blood Vessels" includes considerable data as well as theoretical formulations. The following chapter, "Models of the Arterial System," which discusses dynamic effects including viscoelasticity, is largely theoretical. Data on the dynamic elastic properties of arteries receive little emphasis in either chapter.

The Handbook will be a valuable resource for a wide variety of individuals. It provides an excellent starting point for students as well as experienced engineers and scientists who wish to pursue research within the field of bioengineering. It will provide a valuable reference for courses offered in bioengineering. Engineers designing medical devices will find the book useful, as will physicians and other health scientists with an interest in more quantitative approaches to biomedical problems.

The Handbook will be useful to workers with backgrounds in either the physical or biological sciences. Most of the chapters assume little prior knowledge of either engineering or biology. While individual readers may have difficulty with either the physiological or mathematical details, in most cases these are not essential to obtain an overview of the topic.

The editors have accomplished a monumental task in assembling the contributions of 62 individual authors. In spite of some limitations in its coverage, the Handbook is a unique resource. The field of bioengineering is so diverse that it would be possible to fill an additional volume with reviews of other topics. Hopefully the editors and publishers will continue to expand the coverage in future editions.

Handbook of Bioengineering

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