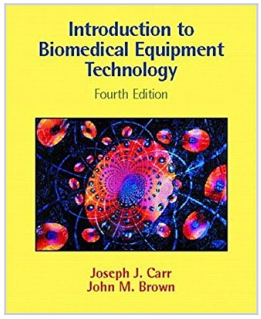


# Introduction to Biomedical Equipment Technology (4th Edition)

*By Joseph J. Carr, John M. Brown*



**Introduction to Biomedical Equipment Technology (4th Edition)** By Joseph J. Carr, John M. Brown

This industry standard on biomedical equipment is an important resource for providing a broad technological knowledge base, and deep coverage of critical points. It serves as a handy reference on unfamiliar topics—organized so that users can easily look up topics of interest, study areas where they are weak or where they have not worked in some time. Chapter topics include an overview of the human body; an introduction to biomedical instrumentation and measurement; basic theories of measurement; signals and noise; electrodes, sensors, and transducers; bioelectric amplifiers; electrocardiograph equipment; respiratory therapy equipment; instrumentation for measuring brain parameters; care and feeding of battery operated equipment; computers in biomedical equipment; and quality assurance and continuous quality improvement. For working professionals in biomedical equipment, and for the engineers and technologists who design it.

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## Editorial Review

From the Publisher
Since the publication of Carr and Brown's biomedical equipment text more than ten years ago, it has become the industry standard. Now, this completely revised second edition promises to set the pace for modern biomedical equipment technology.

From the Back Cover

*Introduction to Biomedical Equipment Technology* is recognized as the premier book used to train biomedical equipment professionals, and serves as an excellent reference for these professionals in the field. It is also a valuable reference work for engineers and technologists who design biomedical equipment.

Significant changes to this edition are:

- A new chapter on quality Improvement is included.
- New sections on hemodialysis machines, the Y2K problem, and new computer devices in medicine are provided.
- Key features have been incorporated to address current issues and important technological advances.



# PREFACE

This textbook is the fourth edition of a premier book used to educate biomedical and other technical professionals over the last two decades. Since technology advances at an ever-increasing pace, we have included some new and exciting changes, which reflect the modern world of medical instrumentation.

Part of the revision effort was a survey of instructors, successful students, managers, and clinical and biomedical engineers and technicians who ultimately employ the readers of this book. New features were added mostly in response to comments and request of the academic reader.

Since this text is broadly organized, working professionals in biomedical electronics and related fields will find it useful for looking up topics of interest and refreshing selected areas, while bypassing more familiar material. In addition, engineers and technologists, who design biomedical equipment, can easily revisit material covering the broad overview or delve into the critical points of pertinent subjects.

Important chapters added to the third edition and retained in this latest edition include information fundamental to a basic education. Chapter 3 is "Introduction to Biomedical Equipment Instrumentation and Measurement." Chapter 4 covers the "Basic Theories of Measurement" technology. Chapter 22 discusses "Computers in Biomedical Equipment," which, among other topics, includes sections on microprocessors and signal acquisition systems, as applied to medical and laboratory instrumentation. This is directed at signal measurement, analog signal processing, analog-to-digital conversion, digital-to-analog conversion, and digital signal processing. These chapters were added to reinforce the concept that many medical instruments are basically electronic measuring devices. The authors believe students need to put into action

concepts of accuracy and precision when diagnosing problems and maintaining medical and laboratory equipment. Basic theory of signals and noise provides a necessary background for understanding commonly encountered signals and what to expect from observing them in analog, digital or software form, in addition to windows pull-down menus. In this way, the authors share their savvy with the reader, which has been formulated from theory and years of personal experience. Also, some of the original chapters were enhanced to better cover essential topics, such as the nature and impact of the Internet in medicine and the use of computers in analyzing medical signals, X-ray films, and patient records. In addition, we have extended many block and circuit diagrams with descriptions to improve the reader's working knowledge of biomedical equipment.

In the fourth edition, chapter 24 on "Electromagnetic Interference to Medical Electronic Equipment," including electromagnetic compatibility has been improved, because this is a major issue today, especially with the FDA. In concert, a new chapter 25 is provided on "Quality Assurance and Continuous Quality Improvement" for two reasons: First, most medical equipment manufacturers must meet ISO-9000 quality assurance standards to sell their equipment in Europe and, increasingly, also in the United States and Canada. Adherence to the recommendations of ISO-9000 may also prove beneficial in defending product liability challenges, because it reflects a manufacturer's ability to set up and consistently apply company and production procedures. Second, hospitals are being forced to provide continuous quality improvement by accreditation authorities, such as the FDA, and their ability to meet these requirements facilitates their competitive edge in the medical marketplace. In addition, chapter 16, "Medical Laboratory Instrumentation," now includes a section on hemodialysis machines to treat kidney failure, because of the increasing requirement for this technology from our aging population. Also, a description of the important Y2K problem now appears in chapter 22, "Computers in Biomedical Equipment," as well as a description of new computer devices in medicine, such as the extended interactive computer system and the palmtop or personal digital assistant (PDA).

We appreciate the cooperation of the Burr-Brown Corp. in providing circuit diagrams. Burr-Brown does not authorize or warrant any Burr-Brown product for use in life support devices and/or systems.

Again, we thank our families for their continuing encouragement in the researching and writing of this latest edition.

Joseph J. Carr, MSEE
Falls Church, VA

John M. Brown,
MSEE, Deng
Tucson, AZ

## Users Review

**From reader reviews:**

**George Green:**

As people who live in often the modest era should be change about what going on or facts even knowledge to make these people keep up with the era which is always change and move forward. Some of you maybe may update themselves by reading books. It is a good choice for you but the problems coming to anyone is you don't know which you should start with. This Introduction to Biomedical Equipment Technology (4th Edition) is our recommendation so you keep up with the world. Why, since this book serves what you want

and want in this era.

**Mary Oliveras:**

Nowadays reading books be than want or need but also be a life style. This reading behavior give you lot of advantages. Advantages you got of course the knowledge the particular information inside the book this improve your knowledge and information. The knowledge you get based on what kind of publication you read, if you want attract knowledge just go with education books but if you want experience happy read one using theme for entertaining for instance comic or novel. Often the Introduction to Biomedical Equipment Technology (4th Edition) is kind of publication which is giving the reader unpredictable experience.

**Daniel Padilla:**

In this particular era which is the greater man or woman or who has ability in doing something more are more valuable than other. Do you want to become one of it? It is just simple approach to have that. What you need to do is just spending your time not much but quite enough to get a look at some books. Among the books in the top record in your reading list will be Introduction to Biomedical Equipment Technology (4th Edition). This book which is qualified as The Hungry Hillsides can get you closer in growing to be precious person. By looking upward and review this publication you can get many advantages.

**Gordon Miller:**

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