Book Review

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In our continuous efforts to encourage sharing of knowledge and publication of engineering and scientific work related to the clinical engineering field, we have initiated a new section of our Global Clinical Engineering journal www.GlobalCE.org named Book Review. We hope that you will find it helpful to your career and at the same time promote the submission of other books for our review serving the benefit of all our readers.

Introduction to Clinical Engineering

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This book review is about the Elsevier Academic Press newly published ***Introduction to Clinical Engineering*** by two authors Samantha Jacques, Ph.D., FACHE, and Barbara Christe, Ph.D. with Foreword by Lawrence (Larry) W. Hertzler, C.C.E., fAAMI. In addition to the Forward, the book contains six chapters, an appendix, and an index for a total of 270 pages. Dr. Jacques (or "Sam" as her colleagues call her) has served as Director/VP of clinical engineering program in several healthcare systems, and her writings express her expertise in healthcare technology management from the applied side. This style adequately complements Dr. Christe's writing that draws from her academic background and pedagogical experience. Together, the two styles combine into a single book that both practitioners and students will find interesting.

True to its title, the book provides a concise introduction to the conventional clinical engineering field that sometimes struggles with identity and recognition. The authors clarify this issue straight up in Chapter 1, the Profession. It starts with an introduction to healthcare technology management (HTM) and argues that clinical engineers are part of HTM. It is an exciting proposition that falls short of the notion that the clinical engineering profession as a learned life science engineering discipline contains a broader scope where HTM is one of its competencies, including consulting, design, informatics, and marketing. In their attempt to clarify a conventional clinical engineering practice, the authors partially achieve their goal; however, they left some confusion with readers, suggesting that technicians and technologists who specifically support medical equipment often function in a biomedical engineer position. Chapter 1 suggests that AAMI in 1973 developed a certification program for clinical engineers but neglected to recognize that this program was discontinued by AAMI and re-initiated through the America College of Clinical Engineering as correctly described few pages later.

The book generally describes the structure of a healthcare system and clinical engineering's role within it from a US point of view. For example, according to Japan's clinical engineering association, over 20,000 certified clinical engineers are licensed to service and to operate complex heart-lung bypass machines as well as dialysis systems. Chapter 2, Healthcare Technology Basics, provides an overview of how medical products enter into commerce and the roles of regulations and FDA function in protecting public safety. I found the scenarios described in section Devices Throughout the Healthcare System and Relationship to Patient care a good topic and practical reference for educating readers about the intersection between care processes and medical technology. Chapter 3 on Healthcare Technology Management introduces the crucial concepts of system

thinking and system engineering. The chapter then follows a short cover of human factors issues and jumps into computerized maintenance management systems (CMMS). It provides an excellent introduction to CMMS with well-organized material.

Chapter 4 on Safety and Systems Safety effectively covers a wide range of subjects that include regulations, standards, safety, risk management, quality, and adverse event investigation. The material is a well organized, easy read; however, the subjects on industry standards and infection control provide limited education for the readers about related international standards bodies and infection control. This is especially notable regarding care areas airway infection management where chapter 6 adds to this content but neglects to connect the readers to it. Furthermore, new air disinfecting tools, which became an increasingly vital component of patient care, both for patients and staff, lacked cover yet are essential during this pandemic era, we all are fighting. Chapter 5 on Information Technology delivers a useful description of the closer relationship between clinical engineering and the Health IT field with an effective comparison between life cycle management that the engineers/technicians follow and the ITIL practice that the IT practitioners do.

Further description of the data flow between medical devices and the EHR is written with clarity and includes content about cybersecurity's evolving importance. This chapter, in my opinion, is one of the best in this book. The final two chapters, chapter 6 on Facilities Management and chapter 7 on Human Resources Management, cover areas that will be most helpful for hospital-based practitioners who were not exposed to these topics previously.

Finally, the most extensive section of the book, almost 100 pages, Appendix: Additional Readings provides, as its name suggests, additional reading that incorporates throughout the various subjects of the Appendix an interesting section of questions to consider, acronyms, and abbreviations. It would have been helpful for the readers to add a table of content. Readers will be able to satisfy their curiosity by continuing further reading in the Appendix subjects related to chapters of the book they are reading at that moment.

The book accomplishes its purpose of providing readers with a clear introduction to the body of knowledge that all novices to the field of clinical engineering must understand. It delivers the reader an appreciation for the vast knowledge one should be competent in and the benefit from realizing how to prepare for their next step in their career.

You can find the handbook at https://www.elsevier.com/books/introduction-to-clinical-engineering/jacques/978-0-12-818103-4?countrycode=US&format=print&utm_source=google_ads&utm_medium=paid_search&utm_campaign=usashoppinglr&gclid=Cj0KCQiAuJb_BRDJARIsAKkycUkC0L0WdkS5fayxfOap78E0KX1HQGBBolT32tBEMUo-lTxKn_KqitYaAk_pEALw_wcB&gclsrc=aw.ds where it is sold, after discount, for US $74.96.

In this field, recently published books were more extensive in scope, suffering format variation due to their multiple contributors, and were more expensive. As this book is aimed at students, novices, and practitioners ready to advance in their career, it will be very useful to this community and anyone else who explores and is curious about clinical engineering as a future career.