
book review corner

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Book Review Editor

The present “Books Received” listing contains several interesting new titles, heat transfer and refrigeration/air-conditioning. Brief content description is given of all listed books. Also, note that the 41st edition of the book, *Steam: Its generation and use*, published by The Babcock & Wilcox Co. is a new release.

If you would like to prepare a detailed review of one of the books listed below, please e-mail me (Ralph.Webb@psu.edu). The book is yours to keep for preparing the review.

books received (with brief content description)

Mechanical Engineering

Advanced Heat and Mass Transfer, Amir Faghri, Yuwen Zhang, John Howell, 956 pages, Global Digital Press, 2010, ISBN: 978-0-9842760-0-4, \$89.95. The chapters of this text book can be viewed on-line at The Thermal Fluids Central website <https://www.thermalfluidscentral.org/e-books/book-intro.php?b=37> In addition one may access, and download, 130 different pdf files of ppt lectures of the book at website <https://www.thermalfluidscentral.org/e-resources/handle/item/2>. The number on each pdf file corresponds to the chapter/section addressed.

Brief Content Review

This textbook provides a uniqueness not found in other competing books. This book covers the subjects of conduction, convection, boiling, condensation, and thermal radiation in a single course at the intermediate or advanced level. This approach is in contrast to the traditional approach of having a course and textbook for the separate subjects of single-phase, two-phase convection, conduction, and radiation. Thus, this textbook seeks to present the subject of heat and mass transfer with a focus on the significant advances in the field in the last decade, while emphasizing the basic, fundamental principles. A closely related key objective is to provide focus on modern applications of heat and mass transfer (e.g., nano-technology, biotechnology,

energy, material processing, etc.), all of which are emphasized via examples and homework problems. Further examples of modern topics are heat and mass transfer applications such as gas turbines, electronic cooling, heat pipes, and food processing equipment, and emerging technologies in sustainable energy including biological systems, security, information technology and nanotechnology. This is in addition to traditional topics in heat exchange technology. Other topics, which are lacking in most other textbooks, are integrated in the present book (e.g., porous media, micro-scale, heat transfer, and multi-phase, multi-component systems). Thus, this single volume advanced book provides both basic and advanced application materials to senior undergraduate and graduate students instead of relying upon several books. Also, professional engineers will find this book an up-to-date important reference for a wide range of topics—from traditional to emerging heat and mass transfer systems.

In addition, the book addresses phase change processes, including boiling, condensation, melting, solidification, sublimation, and vapor deposition from one perspective in the context of the fundamental treatment. Although there are separate chapters on boiling and condensation, the reviewer saw very little material typically addressed in a course on forced convection two-phase flow and heat transfer.

The book presents the generalized integral, differential, and average formulations for the governing equations of transport phenomena. The book employs a top-down approach that first emphasizes the basic physics of the problem by beginning with a general governing equation and then reducing it for the particular problems or analysis addressed. In addition, the foundations of numerical solutions of convective flow are concisely discussed, to provide understanding of the basis and limitations of these methods.

The book is not narrowly focused on traditional issues in mechanical engineering. Rather it is applicable to a wide variety of engineering disciplines—from mechanical and chemical to biomedical and materials engineering—who must master the principles of heat and mass transfer in analyzing and designing any system or systems wherein heat and mass are transferred. This textbook provides a clear presentation of the fundamentals, focused homework problem sets, and tangible examples of how this knowledge is put to use in traditional and modern engineering design. Professional engineers, too, will find this

book invaluable as reference for everything from traditional to emerging heat and mass transfer system. A solution manual is available to instructors, who use the book for course instruction.

Summary of Book Chapters: Introduction; Generalized Governing Equations; Heat Conduction; External Convective Heat and Mass Transfer; Internal Convective Heat and Mass Transfer; Natural Convection; Condensation and Evaporation; Boiling; Fundamentals of Thermal Radiation; Heat Transfer by Radiation. Rather than being contained in an individual chapter, mass transfer is integrated throughout the book.

Springer Handbook of Mechanical Engineering, Grote, Karl-Heinrich; Antonsson, Erik K. (Eds.), 2009, XXVIII, 1580 p. 1822 illus., 1551 in color. With DVD., Hardcover, ISBN: 978-3-540-49131-6.

Brief Content Review

This is a massive 1551 page handbook! Mechanical Engineering handbooks typically cover application of principles of physics, design, manufacturing, and maintenance of mechanical systems. In addition to these main areas, specialized fields are necessary to prepare future engineers for their positions in industry, such as mechatronics and robotics, transportation and logistics, fuel technology, automotive engineering, biomechanics, vibration, optics and others. The *Springer Handbook of Mechanical Engineering* devotes its contents to all areas of interest for the practicing engineer. Authors from all over the world have contributed with their expertise and support the globally working engineer in finding a solution for today's mechanical engineering problems.

Each subject is discussed in detail and supported by numerous figures and tables. DIN standards are retained throughout and ISO equivalents are given where possible. The text offers a concise but detailed and authoritative treatment of the topics with full references.

Key Topics Include:

- Engineering Mathematics
- Mechanics
- Materials Science and Tribology
- Thermodynamics
- Design of Machine Elements
- Manufacturing Engineering
- Measuring and Quality Control
- Engineering Design
- Pressure Vessels and Heat Exchangers
- Turbomachinery
- Transportation Systems
- Construction and Earth Moving Equipment
- Power Generation

- Electrical Engineering
- Enterprise Organization and Operation

Refrigeration Cycles and Systems, Ibrahim Dincer, Mehmet Kanoglu, John Wiley and Sons, 2010—480 pages, US \$120.00, 2010. 480 Pages, Hardcover, ISBN-10: 0-470-74740-4, ISBN-13: 978-0-470-74740-7. Also published on-line: 5 JUL 2010

Brief Content Review

Refrigeration Systems and Applications, 2nd edition offers a comprehensive treatise that addresses real-life technical and operational problems, giving the reader an understanding of the fundamental principles and the practical applications of refrigeration technology. New and analysis techniques (including exergy as a potential tool), models, correlations, procedures and applications and recent developments in the field are included—many of which are taken from the author's research activities in this area. The book also includes discussion of global warming issues and its potential solutions. The book discusses industrial technical and operational problems, as well as new performance improvement techniques and tools for better design and analysis. The contents include fundamental aspects of thermodynamics, fluid flow, and heat transfer; refrigerants; refrigeration cycles and systems; advanced refrigeration cycles and systems, including some novel applications; heat pumps; heat pipes; and many more. It provides explanations, numerous new chapter-end problems and worked-out examples as learning aids for students and instructors. Refrigeration applications include the cooling of electronic devices to food cooling processes. This 2nd edition forms a useful reference source for graduate and postgraduate students and researchers in academia and as well as practicing engineers, who are interested in refrigeration systems and applications, and the methods and analysis tools for their analysis, design and performance improvement. The Chapters address:

- refrigeration cycles and systems;
- vapor-compression refrigeration systems;
- energy analysis of vapor-compression refrigeration cycle;
- practical vapor-compression refrigeration cycle;
- air purging methods—two ways to purge systems of air, manual or automatic;
- air-standard refrigeration cycles—also as reverse Brayton cycles;
- Absorption-Refrigeration Systems (ARSs)—ups and downs;
- basic ARS using ammonia-water solution;
- two-stage or two-effect ARS—vapors driven off by heating first-stage concentrator, driving off more water;
- absorption-augmented engine-driven refrigeration system

Chapter 4 is published on line at <http://onlinelibrary.wiley.com/doi/10.1002/9780470661093.ch4/summary>