# Fundamentals of Heat Transfer

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Engineers and scientists working on the ever increasingly important topic of heat transfer should welcome the publication of this well presented and much needed new book. The treatment of the topic is well done with a substantial number of examples as is the fashion with engineering books originated in the USA.

Part of the work can be used as a text for a first course in the subject at undergraduate level, while the more advanced chapters can serve as the basis for a graduate course. It will also be of interest as a reference book to engineers working on heat transfer problems.

The reader only requires knowledge of basic thermodynamics and fluid mechanics. The first part of the book deals with basic concepts, fundamentals of heat conduction and methods of solution for transient problems, all of them developed along traditional lines but with a large number of worked out examples and problems. The topic of convective problems including turbulence is treated in depth in Chapter 6 which also emphasises the importance of the resulting equations in engineering. This chapter is specially recommended in view of the fundamental concepts advanced there, which include the principal governing equation for convective processes. From there on the book deals with specific applications of interest to engineers, following an integrated convective heat and mass transfer formulation. I found of special practical interest the treatment presented in the chapters on external and internal flows with their emphasis on practical applications. The same applies to Chapter 11, dedicated to heat exchangers, where the principles needed to design or analyse heat exchangers are given.

I liked the treatment presented in the book for the phenomenon of radiation and radiation between surfaces. In particular, radiation is presented and developed from the beginning, recognising its directional nature. This form of presentation, although initially more complex, allows for a more complete treatment of surface radiation processes.

The chapter on multimode heat and mass transfer is also important as it recognises the fact that in many technical problems conduction will occur between different types of media. The previously developed tools are integrated here to indicate how to solve practical engineering problems. I think that it is unfortunate that this chapter is rather short in view of its importance to practising engineers.

The book closes with a well written chapter on mass diffusion which points out the mathematical similarities and physical differences between the two types of processes, ie heat and mass transfer.

A set of useful tables dealing with mathematical relationships and thermophysical properties of materials is presented at the end.

Although the authors indicate the importance of numerical methods to find accurate solutions to practical heat conduction problems, I regret that the only such method presented here is finite differences. Considerable attention has been given to the formulation of this technique but nothing has been advanced on more recent techniques such as finite elements and boundary elements which are essential to solve complex two and three-dimensional heat transfer problems. It is unfortunate that because of this deficiency the book, although very suitable for undergraduates, may not satisfy the requirements of many graduate courses.

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