This book is intended to serve undergraduate engineering students in their introductory heat transfer course. It has been adjusted specifically to match the needs of chemical and mechanical engineering students at the University of Kentucky. The anticipated prerequisites for the course are engineering thermodynamics, two years of calculus, and an introduction to fluid mechanics. The material can be taught to students who lack a fluid mechanics background, but the pace should be considerably slower.

The organization of material has a few unconventional aspects, and the intent of these features should be explained:

- Heat exchangers are discussed in the beginning of the book rather than toward the end. This is easy to do, once the students have learned what a convective heat transfer coefficient is, even though they do not yet know how to predict its value. We have found that students have much more confidence in the worth of subsequent analytical work once they have encountered a major area of application of the subject. Furthermore, heat exchanger design provides a natural link between heat transfer and the previous subject of thermodynamics.

- The first three chapters make up a mini-course in heat transfer—an attempt to acquaint the students rather broadly with the whole subject. In the subsequent development, we try to keep the students aware of the interactions among different modes of heat transfer.

- Dimensional analysis is introduced, without reference to the cumbersome method of indices, in connection with heat conduction. It is then used
throughout the book to simplify the mathematics and to explain data correlations.

- Radiation, though it appears as the final chapter, can be dealt with at any point following Chapter 3.

- The role of the Biot number as a diagnostic device is introduced in the first chapter along with the related notion of a lumped-capacity solution. We view these simple notions as being quite important, and we return to them often.

- Natural convection and film condensation appear in the same chapter. They can be dealt with as separate issues, but we suggest that they be treated together. There is a strong kinship between the subjects, and it is useful to capitalize on this kinship.

- It has been conventional to give short shrift to boiling heat transfer. But modern processes more and more often employ boiling to remove heat. We therefore provide a great deal of material for the instructor who has time to present it.

- R. Eichhorn’s chapter on the numerical analysis of heat transfer is rather detailed and self-explanatory. It can be dealt with at any point after Chapter 3—either all at once, or as the material is needed.

It should be easy to teach the entire book in two, 3-credit “quarters.” About 80% of the material is normally treated in a conventional 3-credit, one-semester course at Kentucky by passing lightly over selected portions of Chapters 5 through 11.

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