

With his characteristic cleverness, George Bernard Shaw armed several generations of cynics with his statement “Those who can, do; those who can’t, teach.” But in today’s world, engineering professors have to be able to do engineering *and* to teach engineering. How they prepare for this task is the subject of this book, which grew out of our conviction that new faculty are entering the university well prepared and well mentored in doing research, but almost totally at sea when it comes to the day-to-day requirements of teaching. At best, graduate students obtain only a second-hand knowledge of teaching, rarely having the opportunity to conduct an entire class for an extended period of time. If their role models are good or, better yet, master teachers, then some of the luster may wear off and they may gain valuable exposure to the craft. More often than not, the opposite occurs. An individual with a desire to teach has to rely on his or her own interest in teaching, and later discovers, with the mounting pressure of producing publications and research, that he or she can give only minimal attention to the classroom. This is a risky way to ensure the future of our discipline.

In 1983 we developed and taught for the first time a graduate course, Educational Methods for Engineers, geared toward Ph.D. candidates who were interested in an academic career. Our sources came from a variety of disciplines, journals, and books because we immediately noticed that no textbook was available which focused solely on engineering. Classic texts such as Hightet’s and McKeachie’s became starting points and we scoured the literature for what was available in engineering. With a grant from the National Science Foundation in 1990 we expanded the course to include all of engineering, conducted a summer workshop, and began this book much earlier than we otherwise could have. Although the writing of this book was supported by NSF, all of the views in this book are the authors’ and do not represent the views of either the National Science Foundation or Purdue University.

Many people have helped us, often unknowingly, in developing the ideas presented in this book. The writings and lectures of the following engineering professors have helped to shape

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Finally, we dedicate this book to our families in appreciation for their patience and support: To our wives, Dot and Sherry, for listening to our complaints; and to our children—Charles and Jennifer, and John and Mary-Kate: with their future in mind we wrote this book.