Preface to the First Edition

Stochastic processes are ways of quantifying the dynamic relationships of sequences of random events. Stochastic models play an important role in elucidating many areas of the natural and engineering sciences. They can be used to analyze the variability inherent in biological and medical processes, to deal with uncertainties affecting managerial decisions and with the complexities of psychological and social interactions, and to provide new perspectives, methodology, models, and intuition to aid in other mathematical and statistical studies.

This book is intended as a beginning text in stochastic processes for students familiar with elementary probability calculus. Its aim is to bridge the gap between basic probability know-how and an intermediate-level course in stochastic processes—for example, *A First Course in Stochastic Processes*, by the present authors.

The objectives of this book are as follows: (1) to introduce students to the standard concepts and methods of stochastic modeling; (2) to illustrate the rich diversity of applications of stochastic processes in the sciences; and (3) to provide exercises in the application of simple stochastic analysis to appropriate problems.

The chapters are organized around several prototype classes of stochastic processes featuring Markov chains in discrete and continuous time, Poisson processes and renewal theory, the evolution of branching events, and queueing models. After the concluding Chapter 9, we provide a list of books that incorporate more advanced discussions of several of the models set forth in this text.