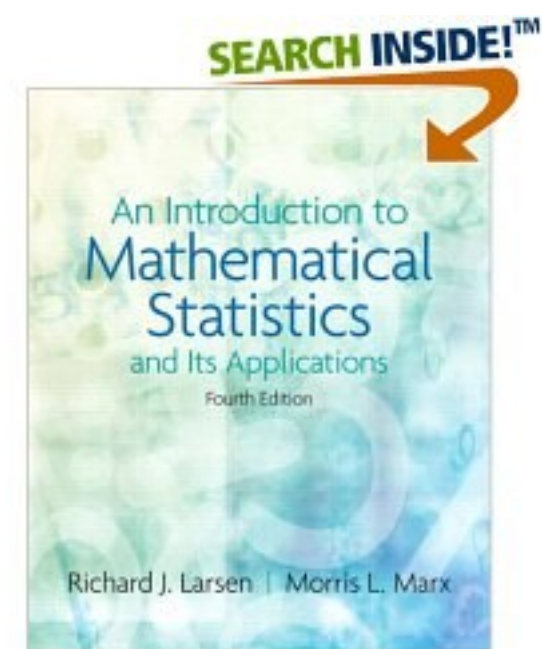


# An Introduction to Mathematical Statistics and Its Applications (Fourth Edition)



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Preface for the 4th edition

We are pleased that our text has been sufficiently well received to justify this fourth edition. Students and instructors who use the text like the coupling of the rigorous and structured treatment of probability and statistics with real-world case studies and examples. The users of the book have been helpful in pointing out ways to improve our presentation. The changes found in this fourth edition reflect the many helpful suggestions we have received, as well as our own experience in teaching from the text.

Our first goal in writing this fourth edition was to continue strengthening the bridge between theory and practice. To that end, we have added sections at the end of each chapter called Taking a Second Look at Statistics. These sections discuss practical problems in applying the ideas in the chapter and also deal with common misunderstandings or faulty approaches. We also have included a new section on Bayesian estimation that integrates well into Chapter 5 on estimation and gives another view of how estimation can be applied. It introduces students to Bayesian ideas and also serves to reinforce the main concepts of estimation.

Some ideas that are useful and important lie beyond the mathematical scope of the text. To explore such topics within the mathematical context of the book, we have increased and enhanced the material on simulation and on the use of Monte Carlo studies. Since MINITAB is the main tool for simulations and demonstrating computer computations, the MINITAB sections have been rewritten to conform to Version 14, the latest release.

A barrier to efficient coverage of the book has been the length of time required to cover Chapters 2 and 3. One of the major changes in the fourth edition is a substantial revision of basic probability material. Chapters 2 and 3 have been reorganized and rewritten with the goal of a streamlined presentation. These chapters are now easier to teach and can be covered in less time, yet without loss of rigor.

In that same spirit, we have also improved and streamlined the development of the  $t$ , chi square and  $F$  distributions in Chapter 7, the heart of the book. The material there has been rewritten to simplify the development of the chi square distribution. In addition, we have made a much better division between the theoretical results and their applications.

Because of the efficiencies in the new edition, covering Chapters 1-7 plus other additional topics in one semester is now possible.

All in all, we feel that this new edition furthers our objective of writing a book that emphasizes the interrelation between probability theory, mathematical statistics, and data analysis. As in previous editions, real-world case studies and historical anecdotes provide valuable tools to effect the integration of these three areas. Our experience in the classroom has strengthened our belief in this approach. Students can better grasp the importance of each area when seen in the context of the other two.

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