Preface from the Second Edition of
Measurement and Data Analysis for Engineering and Science
by Patrick F. Dunn
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This text covers the fundamental tools of experimentation that are currently used by both engineers and scientists. These include the basics of experimentation (types of experiments, units, and technical reporting), the hardware of experiments (electronics, measurement system components, system calibration, and system response), and the methods of data analysis (probability, statistics, uncertainty analysis, regression and correlation, signal characterization, and signal analysis). Historical perspectives also are provided in the text.

This second edition of Measurement and Data Analysis for Engineering and Science follows the original edition published by McGraw-Hill in 2005. Since its first publication, the text has been used annually by over 30 universities and colleges within the U.S., both at the undergraduate and graduate levels. The second edition has been condensed and reorganized following the suggestions of students and instructors who have used the first edition. The second edition differs from the first edition as follows:

• The number of text pages and the cost of the text have been reduced.
• All text material has been updated and corrected.
• The order of the chapters has been changed to reflect the sequence of topics usually covered in an undergraduate class. Former Chapters 2 and 3 are now Chapters 11 and 12, respectively. Their topics (units and technical communication) remain vital to the subject. However, they often can be studied by students without covering the material in lecture. Former Chapter 6 on measurement systems has been moved up to Chapter 3. This immediately follows electronics, now Chapter 2.
• Some sections within chapters have been reorganized to make the text easier to follow as an introductory undergraduate text. Some sections now are denoted by asterisks, indicating that they typically are not covered during lecture in an introductory undergraduate course. The complete text, including the sections denoted by an asterisk, can be used as an upper-level undergraduate or introductory graduate text.
• Over 150 new problems have been added, bringing the total to over 420 problems. A Problem Topic Summary now is included immediately before the review and homework problems at the end of each chapter to guide the instructor and student to specific problems by topic.
• The text is now complemented by an extensive text web site for students and instructors (www.nd.edu/~pdunn/www.text/measurements.html). Most appendices and some chapter features of the first edition have been moved to this site. These include unit conversions (formerly Appendix C), learning objectives (formerly Appendix D), review crossword puzzles and solutions (formerly at the end of each chapter and Appendix F), differential equation derivations (formerly Appendix I), laboratory exercise descriptions (formerly Appendix H), MATLAB sidebars with M-files (formerly in each chapter), and homework data files. Instructors who adopt the text for their course can receive a CD containing the review problem/homework problem solutions manual, the laboratory exercise solution manual, and a complete set of slide presentations for lecture from Taylor & Francis / CRC Press.

Many people contributed to the first edition. They are acknowledged in the first edition preface (see the text web site). Since then, further contributions have been made by some of my Notre Dame engineering students, my senior teaching assistants Dr. Michael Davis and Benjamin Mertz, and my colleagues Professor Flint Thomas, Dr. Edmundo Corona, Professor Emeritus Raymond Brach, Dr. Abdelmaged Ibrahim, and Professor David Go. Dr. Eric Matlis and Mr. Leon Hluchota provided the instruments shown on the cover. Jonathan Plant also has supported me as the editor of both editions.

Most importantly, each and every member of my family has always been there with me along the way. This extends from my wife, Carol, who is happy to see the second edition completed, to my grandson, Eliot, whose curiosity will make him a great experimentalist.

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