Measurement and Instrumentation

Description: Measurement and Instrumentation introduces undergraduate engineering students to the measurement principles and the range of sensors and instruments that are used for measuring physical variables. Based on Morris's Measurement and Instrumentation Principles, this brand new text has been fully updated with coverage of the latest developments in such measurement technologies as smart sensors, intelligent instruments, microsensors, digital recorders and displays and interfaces. Clearly and comprehensively written, this textbook provides students with the knowledge and tools, including examples in LABVIEW, to design and build measurement systems for virtually any engineering application. The text features chapters on data acquisition and signal processing with LabVIEW from Dr. Reza Langari, Professor of Mechanical Engineering at Texas A&M University.

- Early coverage of measurement system design provides students with a better framework for understanding the importance of studying measurement and instrumentation
- Includes significant material on data acquisition, coverage of sampling theory and linkage to acquisition/processing software, providing students with a more modern approach to the subject matter, in line with actual data acquisition and instrumentation techniques now used in industry.
- Extensive coverage of uncertainty (inaccuracy) aids students' ability to determine the precision of instruments
- Integrated use of LabVIEW examples and problems enhances students' ability to understand and retain content

Contents:
- Introduction to Measurement
- Types of Instruments and Performance Characteristics
- Errors During the Measurement Process
- Calibration of Measuring Sensors and Instruments
- Data Acquisition with LabVIEW
- Signal Processing with LabVIEW
- Electrical Indicating and Test Instruments
- Display, Recording and Presentation of Measurement Data
- Variable Conversion Elements
- Signal Transmission
- Digital Computation and Intelligent Instruments
- Measurement Reliability and Safety Systems
- Sensor Technologies
- Temperature Measurement
- Pressure Measurement
- Flow Measurement
- Level Measurement
- Mass, Force and Torque Measurement
- Translational Motion Transducers
- Rotational Motion; Appendix A Conversion Tables Between Imperial and SI Units
- Appendix B Thevenin's Theorem
- Appendix C Thermocouple Tables

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