



# Fundamentals of Semiconductor Manufacturing and Process Control

*By Gary S. May, Costas J. Spanos*

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**Fundamentals of Semiconductor Manufacturing and Process Control** By Gary S. May, Costas J. Spanos

A practical guide to semiconductor manufacturing from process control to yield modeling and experimental design

Fundamentals of Semiconductor Manufacturing and Process Control covers all issues involved in manufacturing microelectronic devices and circuits, including fabrication sequences, process control, experimental design, process modeling, yield modeling, and CIM/CAM systems. Readers are introduced to both the theory and practice of all basic manufacturing concepts.

Following an overview of manufacturing and technology, the text explores process monitoring methods, including those that focus on product wafers and those that focus on the equipment used to produce wafers. Next, the text sets forth some fundamentals of statistics and yield modeling, which set the foundation for a detailed discussion of how statistical process control is used to analyze quality and improve yields.

The discussion of statistical experimental design offers readers a powerful approach for systematically varying controllable process conditions and determining their impact on output parameters that measure quality. The authors introduce process modeling concepts, including several advanced process control topics such as run-by-run, supervisory control, and process and equipment diagnosis.

Critical coverage includes the following:

- \* Combines process control and semiconductor manufacturing
- \* Unique treatment of system and software technology and management of overall manufacturing systems
- \* Chapters include case studies, sample problems, and suggested exercises
- \* Instructor support includes electronic copies of the figures and an instructor's manual

Graduate-level students and industrial practitioners will benefit from the detailed examination of how electronic materials and supplies are converted into finished

integrated circuits and electronic products in a high-volume manufacturing environment.

An Instructor's Manual presenting detailed solutions to all the problems in the book is available from the Wiley editorial department.

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### Editorial Review

#### Review

"...offers insight into the IC manufacturing process...[to] the practicing engineer or interested professional."  
(*IEEE Circuits & Devices Magazine*, November/December 2006)

#### From the Back Cover

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#### About the Author

**GARY S. MAY**, PhD, is Professor in the School of Electrical and Computer Engineering at the Georgia Institute of Technology. Dr. May is a Fellow of the IEEE and Senior Member of the Society of Manufacturing Engineers. He has published more than 150 articles and given over 100 technical presentations in the area of IC computer-aided manufacturing.

**COSTAS J. SPANOS**, PhD, is Professor in the Department of Electrical Engineering and Computer Sciences and the Associate Dean for Research for the College of Engineering at the University of California, Berkeley. Dr. Spanos is a Fellow of the IEEE and has published extensively in the area of semiconductor

manufacturing.

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