


# The Management and Control of Quality



JAMES R. EVANS  
WILLIAM M. LINDSAY





# **The Management and Control of Quality**



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# **The Management and Control of Quality**



**JAMES R. EVANS**  
University of Cincinnati

**WILLIAM M. LINDSAY**  
Northern Kentucky University

**WEST PUBLISHING COMPANY**  
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## **To Our Families**

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# PREFACE

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The purpose of this book is to provide undergraduate and MBA-level students of business administration, operations management, industrial management, and other relevant disciplines with an introduction to quality management and control. Quality is perhaps the most important issue facing manufacturers in the United States today. According to Dr. A. V. Feigenbaum, president of General Systems Co. Inc., quality is the most powerful corporate leverage point for achieving both customer satisfaction and lower costs. It is well-known that in recent years, Japan and other nations have improved the quality level of their products to a point where they have a dominant position in world markets. This growth of world competition has caused a critical assessment of quality assurance practice and philosophy in the United States and throughout the world. A fundamental knowledge of the principles of quality assurance is a prerequisite for success in today's business world.

Many books have been published in the area of quality control. However, most of these have either a heavy "handbook"-oriented emphasis toward statistics, or are primarily a practitioner's philosophical treatise. Few have been written as true textbooks for contemporary college business students. With this goal in mind, we focus from an introductory perspective on both the technical and the managerial issues that are important in understanding and implementing quality assurance.

## **Organization**

The book is divided into five parts. Part 1, The Quality System, deals with the fundamental nature of quality assurance, its strategic importance in business and industry, and the economic impacts of quality. In Part 2, The Management System, we develop the managerial issues involved in planning and designing quality assurance systems, behavioral issues in motivation, control of quality systems, and employee involvement. In Part 3, The Technical System: Quality of Design and Performance, the focus is on engineering and statistical concepts relevant to designing for quality in manufacturing and service organizations. Chapters include a review of fundamental statistics, product design, process planning, and reliability. In Part 4, The Technical System: Quality of Conformance, topics of inspection and measurement, process control, and acceptance sampling are covered. The concluding chapter in Part 5 synthesizes both managerial and technical issues relating to quality problem solving.

## Key Features

We introduce new pedagogical features not found in other quality assurance textbooks. “Quality in Practice” cases are found in nearly every chapter. These illustrations of actual applications of quality assurance are drawn from practitioner’s literature and are designed to demonstrate actual practice of quality concepts. Many contemporary topics such as automation, quality assurance for software, and quality circles, not found in many other textbooks, are included. In addition, each chapter contains many questions for review and discussion and many contain problems which require numerical solution or interpretation.

We have designed the text to be flexible in coverage. For example, process control and acceptance sampling material are each broken down into two chapters. The first covers fundamental concepts and elementary techniques; the second, which discusses more advanced techniques and mathematical details, can be skipped at the instructor’s discretion for less technical emphasis.

Because of this flexibility in organization, the book can be used in courses in which either a managerial or a technical emphasis is sought. For example, a one-quarter course appropriate for general business administration students or MBA students might consist of the following chapters:

- Chapter 1: Quality Assurance in Organizations
- Chapter 2: The Economics of Quality Assurance
- Chapter 3: Planning for Quality Assurance
- Chapter 4: Organizing for Quality
- Chapter 5: Motivation and Control for Quality
- Chapter 6: Employee Involvement Teams and Quality Assurance
- Chapter 7: Review of Fundamental Statistics
- Chapter 12: Fundamentals of Statistical Process Control
- Chapter 14: Fundamentals of Acceptance Sampling
- Chapter 16: Quality Analysis and Problem Solving

A one-semester course can supplement this outline with additional material from Chapters 8 through 11.

A one-quarter course designed with a technical orientation might follow the outline suggested below:

- Chapter 1: Quality Assurance in Organizations
- Chapter 2: The Economics of Quality Assurance
- Chapter 8: Quality and Product Design
- Chapter 9: Quality in Process Planning
- Chapter 10: Quality and Reliability
- Chapter 11: Inspection and Measurement
- Chapter 12: Fundamentals of Statistical Process Control
- Chapter 13: Additional Topics in Statistical Process Control
- Chapter 14: Fundamentals of Acceptance Sampling
- Chapter 15: Additional Topics in Acceptance Sampling

A one-semester course could include some material from Chapters 3–6 and Chapter 16, Quality Analysis and Problem Solving.

## Software Supplements

Also included in this text are chapter appendices describing a Lotus 1–2–3 based spreadsheet template package for quality control applications. These templates are selected from the STATPAD and SAMSPAD-I software, products of Professional Applications Development, 12 Sandy Way, Weymouth, MA 02191, (617) 331–4062. Student versions are available for sale in quantity to bona fide educational institutions. Further information can be obtained at the above address.

## Acknowledgments

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James R. Evans  
William M. Lindsay



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