



# MANUFACTURING PLANNING AND CONTROL *for* SUPPLY CHAIN MANAGEMENT

**APICS/CPIM CERTIFICATION EDITION**

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# Manufacturing Planning and Control for Supply Chain Management

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APICS/CPIM Certification Edition

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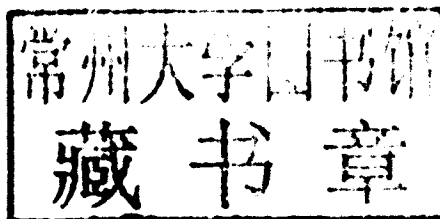
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**Manufacturing Planning and Control for  
Supply Chain Management: APICS/CPIM Certification Edition**

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# PREFACE

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Interest in learning about manufacturing planning and control (MPC) is at a very high level around the world. There are versions of this book in a number of different languages attesting to its popularity as a standard reference on the topic. APICS—the Association for Operations Management—has seen growing interest in its Certified in Production and Inventory Management (CPIM) exam over the past few years. The number of people taking the exam has grown, particularly in countries outside the United States. Further, there are many individuals developing certification courses designed to efficiently teach the material to those wanting to take the exam. This APICS/CPIM special version of the book is especially designed for individuals studying for the exam.

As you may already know, the CPIM exam is divided into five modules. Although this book is not organized to directly correspond to these five modules, the book does provide fairly complete coverage of the topics in the five modules. In the tables following the Preface, we provide maps that show how the CPIM modules align with material in this book. Except for coverage of quality control (QC) and project management (PM), the coverage is very complete. We have not included these topics in this book in order to maintain our focus on MPC. Our goal has been to make this the *definitive* reference for MPC, so our coverage is more comprehensive in this area, and we leave the specialized topics of QC and PM to other books.

This book makes a great reference for those studying for the exam by providing practice questions similar to what one might see on the exam. These questions are at the end of each chapter. There are different types of questions, including objective definition questions, short problems, and more comprehensive sets of questions based on a scenario. This is similar to what one would see on the exam.

A real advantage of this book is that it goes well beyond the basics and can be used as a desk reference long after the CPIM exam has been taken. The book has proven to be the definitive reference for MPC for the past 26 years. The original authors of the book were true founding thought leaders in the field. Of course, the book has been significantly updated over the years as technology has changed and as we have learned more about how these things should be done.

In a sense, this edition of the book is designed to recognize the maturity of much of the material in this book. Since the first edition, published in 1984, the techniques and

concepts in the book have developed to where most of the ideas are now commonly available in ERP (enterprise resource planning) systems. So, in this edition, we have significantly streamlined the presentation of the basic ideas. Our idea is that many of the readers of this book are students just learning the material who will appreciate a concise presentation with clear examples. We have, therefore, removed much of the “research”-oriented material that was included in previous editions. We have removed some of the ideas that are not currently utilized, while adding new ideas that are now commonly used.

The first twelve chapters of the book provide a thorough coverage of manufacturing planning and control. In the spirit of previous editions of the book, our coverage is extensive and complete, yet as concise as we feel is reasonable. We are careful in our use of terminology so as not to confuse the reader by minimizing the use of “lingo,” while introducing the vernacular of the operations and supply chain management professional. Terminology and the organization of the topics closely follow that used by APICS in the *APICS Dictionary* and in the *APICS Body of Knowledge Framework* (which was co-authored by an author of this book).

The last five chapters of the book focus on the integration of manufacturing with the supply chain. In these chapters, our emphasis is on the basic techniques and concepts, and we cover them in a manner that corresponds to how they are commonly implemented in ERP systems. Integration of MPC with the logistics and warehousing functions in the firm can no longer be an “arm’s length” activity. Speed and efficiency require tight integration of these activities with minimal inventory buffering. Complicating matters is the often-common outsourcing of the shipping and warehousing activities, which places complex supply chain-related demands on the MPC system.

It is our contention that the supply chain professional of the future needs a very strong understanding of the material in this book. Just as the professional accountant must understand the basics of assets, liabilities, the balance sheet, and the income and expense statements, together with the transactions that generate the data in the accounting systems, so too must the supply chain professional understand a set of basic techniques and concepts. The sales and operations plan, master schedule, material requirements planning, and distribution requirements planning records tie the manufacturing function to the supplier on the inbound side and the customer on the outbound side in terms of material and inventory. Logic such as regression analysis, exponential smoothing, available-to-promise, material planning, and reorder points are the decision support tools that assist the professional making rational decisions within the realm of manufacturing and supply chain planning.

This book is designed to be an essential resource for both the student of the field and the practicing professional. Mastery of the contents provides a solid foundation on which comprehensive, firm-specific implementations can be developed. It is our contention

that each firm has unique requirements dependent on special supplier and market requirements. A sustainable competitive advantage comes from taking an innovative approach to how material and inventory is managed. A comprehensive understanding of the key concepts and techniques available is essential to structuring and implementing the supply chain material and inventory planning systems used by the firm. This book is designed to support this understanding.

Chapter																	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Covered
Basics of Supply Chain Management																	
I. Businesswide Concepts																	
Organizational fundamentals	X																Yes
Operating environments	X	X	X											X		X	Yes
Financial fundamentals				X													Yes
Enterprise resource planning (ERP)	X	X											X				Yes
Lean (JIT)											X	X				X	Yes
Quality management systems	X																Yes
Impact of environment on system design and deployment									X		X						Yes
Theory of constraints (TOC)									X	X							Yes
II. Demand Management																	
Market driven			X														Yes
Customer expectations and definition of value	X																Yes
Customer relationship management (CRM)			X														Yes
Demand planning			X										X				Yes

Chapter																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Covered																
III. Transformation of Demand into Supply																
Design												X				Yes
Capacity management									X	X						Yes
Planning	X			X		X			X							Yes
Execution and control	X								X	X	X					Yes
Performance measurements	X														X	Yes
IV. Supply																
Inventory		X				X		X				X			X	Yes
Purchasing															X	Yes
Physical distribution system													X	X		Yes



Chapter																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<b>Master Planning of Resources</b>																
<b>I. Demand Management</b>																
General concepts and purposes		X														Yes
Forecasting demand		X	X										X			Yes
Management of the customer interface		X				X										Yes
Distribution planning		X											X			Yes
<b>II. Sales and Operations Planning</b>																
General concepts and purposes		X		X												Yes
Management considerations			X	X												Yes
SOP process				X												Yes
Developing and validating the production plan				X	X											Yes
<b>III. Master Scheduling</b>																
General concepts and purposes				X		X										Yes
Linking the master scheduling process to the business environment						X										Yes
Management considerations						X										Yes
The master scheduling process			X			X			X							Yes
Measuring master schedule performance						X			X							Yes

Chapter																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Covered																
<b>Detailed Scheduling and Planning</b>																
<b>I. Planning the Management of Inventory</b>																
Types and classifications of inventory								X								Yes
Inventory policies							X								X	Yes
Inventory planning			X				X					X				Yes
Accuracy, handling, and storage															X	Yes
<b>II. Planning Material Requirements to Support the Master Schedule</b>																
Identifying information used in the material planning process							X	X		X						Yes
Identifying the desirable characteristics of the detailed material planning process							X									Yes
Mechanics of the detailed material planning process							X								X	Yes
Maintaining the validity of the material plan							X	X		X	X			X		Yes
Managing the project plan										X						Yes

(Continued)

Continued

Chapter																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Covered																
III. Planning Operations to Support the Priority Plan																
Identifying information used in the detailed capacity planning process								X								Yes
Recognizing the characteristics and techniques of the detailed capacity planning process											X					Yes
Using the detailed capacity planning process									X	X	X					Yes
Measuring the performance of the detailed planning process									X		X	X				Yes
IV. Planning Procurement and External Sources of Supply																
Establishing relationships with suppliers	X														X	Yes
Techniques and concepts for supplier partnerships		X														Yes

Chapter																	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Covered
<b>Execution and Control of Operations</b>																	
<b>I. Prioritizing and Sequencing Work to Be Performed</b>																	
Interfaces									X								Yes
Operational environment									X								Yes
Understanding and controlling operations by schedule development							X		X	X	X						Yes
<b>II. Executing the Plans, Implementing Control, and Reporting Results of Activities Performed</b>																	
Understanding the operations of push systems							X										Yes
Understanding the operations of pull systems											X	X					Yes
Communicating internal information												X					Yes
Communicating external customer-supplier information												X					Yes
Material flow and location												X					Yes
<b>III. Performance Reporting and Feedback</b>																	
Quality management processes																	No
Monitoring supplier performance																X	Yes
Monitoring and measuring operations performance										X							Yes
Cost management process												X					Yes



# ACKNOWLEDGMENTS

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As with all of the previous editions of this book, we have benefited from the comments of the many reviewers and users of the book. We are indebted to all of the loyal readers of the book who have given us literally thousands of ideas about how things should be explained, concepts that should be included, and stories about how it is done in practice. The process of change and updating is continuous with a book of this type, and we sincerely want to thank all who have lent their time to this effort.

We particularly want to thank the staff at APICS—the Association for Operations Management—for their support of this book. Abe Eshkenazi, the chief executive officer, and Sharon Rice, executive vice president of professional development, have been helpful in the development of this book. We have found the feedback from the volunteer exam committees at APICS helpful as well, and want to thank them.

For this edition, we especially want to thank Greg DeYong and Jerry Kilty for their help. Greg wrote the questions for each chapter and provided many helpful suggestions. Jerry has spent much time just talking to us about the APICS Certification Exam modules and how the Certification courses work. We have also enjoyed working with the APICS E&R Board, where Jerry, together with Robert Vokurka, Romona Memmott, Jim Chisholm, and Mark Harris, has been fun to work with.

A special thanks to Rhonda Lummus for all of the spirited discussion about this book and supply chain management in general. She has been a great inspiration over the past two years.

Finally, we need to thank the staff at McGraw-Hill. In the Higher Education division, special thanks to Dick Hercher, who kept the team going for six editions of this book. Judy Bass from McGraw-Hill Professional was the key person who enabled the special APICS/CPIM Edition to be published. Thanks very much to both of you for the support.

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