Eastern Economy Edition

M.P. Gupta
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Fourth Edition

Quantitative Techniques for Decision Making

PHI

Quantitative Techniques for Decision Making

Fourth Edition

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QUANTITATIVE TECHNIQUES FOR DECISION MAKING, Fourth Edition
M.P. Gupta and R.B. Khanna

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PREFACE

The overwhelming response to the Third Edition of the book has encouraged us to present the Fourth Edition of the book. The changes in this edition are based on the feedback and suggestions from our readers and colleagues which we gratefully acknowledge.

We have added a separate supplement 'Mathematics for Managers' in the form of an appendix, which covers Matrix Algebra and Differential Calculus. While these do not strictly come under the purview of operations research, a large number of academic institutions and universities include these in their syllabi for management programmes at the undergraduate and postgraduate levels. The inclusion of this supplement will offer a complete coverage of the syllabi in one book.

Since most computer software in use today for network analysis and project management draw networks in an Activity on Node format, we have included a section on drawing of networks in the Activity on Node format so that readers can interpret computer solutions with ease.

We have also included a number of solved and unsolved problems. We have retained the format of our earlier editions and have stuck to the simplicity that was our goal from the very outset—to present material in an easily understandable manner sans the rigour of classical mathematics, and amply illustrated with life-like problems and examples.

A revised CD is available as resource material for instructors. It contains PowerPoint presentations for all chapters and can be effectively used along with the normal 'chalk and talk' style.

We look forward to continuing support from our colleagues and our readers and shall welcome any suggestions for further improvement so that we can fully satisfy the needs and requirements of our readers. These can be sent by e-mail to rbkhanna@gmail.com.

MP Gupta
RB Khanna

PREFACE TO THE FIRST EDITION

Decision making is a manager's primary task. The quality of the decisions can be the difference between success and failure of a business enterprise. While a qualitative analysis is invariably carried out, a quantitative analysis is often avoided. The two, used conjunctively can reinforce, negate or call for a review of decisions which may have otherwise been taken. Business is associated with finance and commerce and, hence, the arts. However, the bottom line for any business or enterprise is profits and these can only be measured in monetary terms. Some quantification is always involved in planning inventories, production schedules and calculating revenues and expenses. Yet, managers are generally shy of mathematics. It is not just the computational difficulty that turns them away but also the fact that quantification implies commitment and a certain degree of precision. One can say that Option A is better than Option B but quantitative techniques require that the decision maker or analyst states by how much Option A is better than B.

Operations Research provides the basis for decision making in a scientific and rational manner. It is often shrouded in mathematical complexity which 'scares' away managers and management students. The advent of high-speed computers and the availability of adequate software packages has eased the tedium of manual computations. Stress must shift from the actual computational methods used, to understanding of problem situations and identifying solution approaches.

This book is aimed at providing the management students and managers a working knowledge of Operations Research and its applications. Engineering students may not find the mathematical rigour they are used to, but the book aims at providing them with a better understanding of the practical utility of mathematical modelling and techniques. The book attempts to put across techniques in a language and manner which does not require more than basic arithmetic that every person learns in school. Effort has been made to avoid mathematical symbols beyond the

elementary ones of addition, subtraction, multiplication and division. Rigorous mathematical proofs, generalised symbolic models and general equations have been avoided as far as practical. While simplicity has been the aim of this book it is limited by the Einsteinian injunction:

Everything should be made simple, but not simpler than simple.

The book approaches the subject from a practical point of view and all problems are related to life-like situations similar to those faced so often by managers in their day to day functioning. Quite a few problems have been taken from old question papers of various universities and professional examinations. Each chapter begins with a case study. We have also included a section in each chapter dealing with solutions of the problems with the help of computer software. Answers have been provided for all the unsolved exercises so that the readers can gain confidence in their ability to solve problems. Problem formulations have also been included where considered necessary.

Suggestions for improvement to the text are most welcome and will be gratefully acknowledged.

M.P. GUPTA
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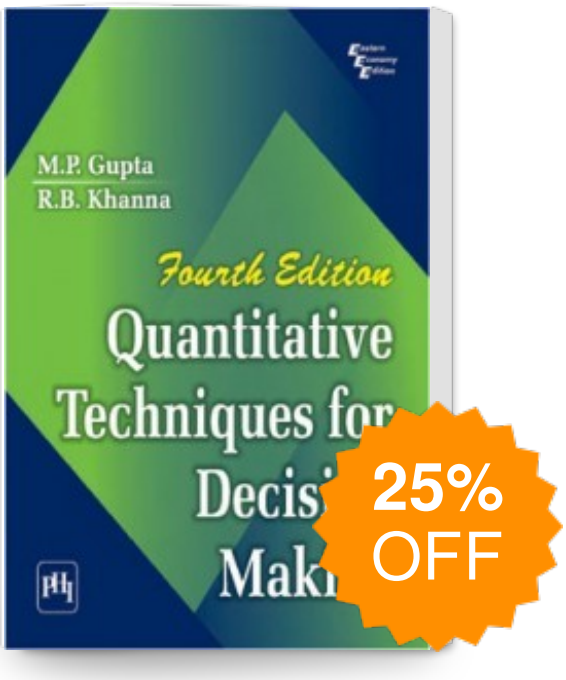

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