Supplement

Management mathematics

Economics, Management, Finance and the Social Sciences

1995 2790**076**

June 2006, first supplement

This supplement contains updated and additional information relating to the current edition of the subject guide.

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University of London
Stewart House
32 Russell Square
London WC1B 5DN
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Web site: www.londonexternal.ac.uk

Published by: University of London Press

Printed by: Central Printing Service, University of London, England

Management mathematics 2790076

Economics, Management, Finance and the Social Sciences.

First edition 1995, written by Mr R.D. Hewins.

This supplement to the first edition, June 2006, written by Mr R.D. Hewins.

Introduction

The current edition of the subject guide was written in 1995 and reprinted without amendment in 1999.

The purpose of this supplement to the subject guide for Management mathematics (2790076) is to:

- provide up-to-date reading references
- give an indication of the direction in which the syllabus has evolved over the years
- highlight topics in the unit that have become more important and, because of changing syllabuses in other units available on the EMFSS programme, indicate those topics still in the subject guide that have now become peripheral to the main thrust of the unit.
- correct (via an Errata Sheet) some of the minor errors contained within the guide.

Updates to reading

Essential reading

Some of you may have access to some of the texts originally referred to in the subject guide. If so, it is important to note they remain extremely useful. There are few new techniques and theories at the level of mathematics covered in this unit. However, we have revised and now present a new and updated list of essential reading which supercedes that which you will find in the subject guide.

Unfortunately there is no single text that covers the whole unit. You might have to judge which texts to acquire as a consequence of your understanding and interest in individual topics. The texts listed here are those in which the subject guide author feels there is likely to be most benefit from reading outside the subject guide and past examination papers. They cover topics that candidates sometimes find difficult and that often require further explanation.

We recommend that you obtain a copy of the following books:

Brzezniak, Z. and T. Zastawniak *Basic Stochastic Processes: a Course Through Exercises.* (Berlin: Springer, 1998) Springer Undergraduate Mathematics [ISBN 3540761756].

Dowling, E.T. *Schaum's Outline of Theory and Problems of Introduction to Mathematical Economics.* (New York: McGraw Hill, 2001) [ISBN 007135896X].

Hanke, J.E. and D.W. Wichern *Business Forecasting.* (Upper Saddle River, NJ: Prentice Hall, 2005) [ISBN 0131248545].

Johnson, R.A., and D.W. Wilchern *Applied Multivariate Statistical Analysis.* (Upper Saddle River, NJ: Prentice-Hall,1992) fifth edition [ISBN 0130925535].

Further reading

There are a number of additional texts that cover certain aspects of the unit and provide additional material and examples.

Gujarati, N. *Basic Econometrics.* (Boston; London: McGraw-Hill, 2003) [ISBN 0071123423].

Jacques, I. *Mathematics for Economics and Business.* (Upper Saddle River, NJ: Prentice-Hall, 2003) fourth edition [ISBN 0273655647]. This text is primarily useful as a reference source for the basic mathematical techniques and functions that effectively form a prerequisite in terms of the understanding required for the Management mathematics unit. An alternative would be Barnett and Zeigler (see list in subject guide) (third edition 1994) [ISBN 0023059311].

Owen, F. and R. Jones *Statistics.* (London: Pitman, 1994) [ISBN 0273603205]. This is a nice straightforward statistical text. However, for Management mathematics it is only the book's section on index numbers that is appropriate.

Updated references for the essential reading and examination advice

This table gives updated references to the **new essential reading** texts (where applicable) for each chapter of the subject guide. For some chapters the best source of material and examples is either the subject guide itself and past examination papers and their Examiners' reports which all students are sent towards the end of the calendar year and which are also made available online on the University of London External Programme web site. Where this is the case, we note it here as 'EP & ER' below. It should be emphasised that in many respects the past papers and (for some discussion type questions) the subject guide are always the best source of guidance as to the types of questions faced in the examination.

The purpose of this section of the supplement is to explain the **developments in the examined material** for the various chapters and topics of the unit and to indicate those that are now regarded as especially important and those that now have less importance.

Subject guide chapter	Examination advice	Updates to reading
1. Set theory	Still a central part of the unit and a variety of questions have been posed in past papers.	EP & ER. The Set Theory chapter has a particular approach not adequately covered in other texts. In this situation candidates are particularly urged to review past papers.
2. Index numbers	Still a central part of the unit and a variety of questions have been posed in past papers.	The essential reading is Owen and Jones, and past examination papers. Of the books mentioned previously, Jacques and Owen and Jones are the only ones which have a section on index numbers. Most candidates will find the subject guide sufficiently detailed and hence there is no need to acquire these books purely for the sake of Index Numbers. Lots of modern standard statistical texts will have a section on Index Numbers.

Subject guide chapter	Examination advice	Updates to reading
3. Trigonometric functions	Rarely seen as anything other than a means of solving certain second order difference or differential equations. However, occasionally one needs to integrate, differentiate, expand or graph trigonometric functions and hence the chapter is still part of the examined syllabus.	Dowling is the essential reading for Chapters 3 and 4. These two chapters are primarily prerequisites, in that they prepare you for Chapters 5 and 6. However, examination papers do occasionally contain questions which require expansion of trigonometric function or calculus involving trigonometric functions or manipulation of imaginary numbers and production of Argand diagrams.
4. Imaginary numbers	Similar to Chapter 3 (i.e. a stepping stone to understanding Chapters 5 and 6). Candidates are sometimes examined on the topics mentioned under 'What you need to know' in section 4.7 of the subject guide.	
5. Difference equations	Although some of this is covered in other units, second order difference equations remain an essential part of Management mathematics.	Dowling is the essential reading.
6. Differential equations	Although some of this is covered in other units, both first and second order differential equations remain essential parts of Management mathematics.	Dowling is the essential reading.
7. Further applications of matrices	Still a central part of the unit and a variety of questions have been posed in past papers.	Dowling is the essential reading.
8. Markov chains and stochastic processes	Although we do note that candidates find this topic difficult, it is still a central part of the unit and a variety of questions have been posed in past papers.	Brzezniak and Zastawniak is the essential reading.
9.Further aspects and applications of calculus	**This topic is slowly diminishing in importance for the examination but it may still be examined.**	Dowling is the essential reading.
10. Optimization under constraints	**IMPORTANT: This has become a part of earlier units of most degrees and from the examination in 2007 will no longer be examined on unit 76 Management mathematics.**	
11. Stochastic modelling, multivariate models	The material specifically covered in the subject guide chapter is only covered on a discussion – rather than calculation – basis. It is likely to be extended in years to come and remains an important part of the unit. The discussion and 'theory' contained within this chapter of the subject guide has been widely underutilised by past candidates.	Johnson and Wichern is the essential reading.

Subject guide chapter	Examination advice	Updates to reading
12. Forecasting	Still a central part of the unit and a variety of questions have been posed in past papers. It is likely to be a part of the unit which will be developed further in the future. The discussion and 'theory' contained within this chapter of the subject guide has been widely underutilised by past candidates.	Johnson and Wichern is the essential reading.
13. Econometric modelling	Multiple regression remains an essential part of the unit and a prime example of econometric modelling. The discussion and 'theory' contained within this chapter of the subject guide has been widely underutilised by past candidates.	Hanke and Wichern is the essential reading.
14. Exploratory data analysis	The popular area of cluster analysis remains a central part of the unit; a variety of questions have been posed in past papers. The discussion and 'theory' contained within this chapter of the subject guide has been widely underutilised by past candidates.	Johnson and Wichern is the essential reading.

Errata sheet

There are a few relatively minor errors contained within the printed subject guide. They are noted here:

p.13, Section 2.5: Average Price Relative Index for k commodities at period t is

$$\frac{1}{k}\sum_{i=1}^{k}\frac{p_{it}}{p_{i0}}$$

p.25, Section 3.3: v) $\cos(\alpha - \beta) = \cos\alpha\cos\beta + \sin\alpha\sin\beta$

p.44, Example 7.1: The solution process is okay, but the given technological matrix doesn't really make sense. Example 7.2 on p.117 is more realistic.

Notes