



Quantitative Models for Managers

MFQ-2-100

Business Computing &
Information Management

2007-08

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1. UNIT DETAILS

Unit Title:	Quantitative Models for Managers
Unit Level:	Two
Unit Reference Number:	MFQ-2-206
Credit Value:	1
Student Study Hours:	150
Contact Hours:	48
Private Study Hours:	102
Pre-requisite Learning (If applicable):	Quantitative Literacy (or equivalent).
Co-requisite Units (If applicable):	None
Course(s):	BABS/BABA/Combined Honours
Year and Semester	Yr 2 Semester 2
Unit Coordinator:	Martin Abram
UC Contact Details (Tel, Email, Room)	X6170, abrammr@lsbu.ac.uk , L113b
Teaching Team & Contact Details (If applicable):	n/a
Subject Area:	Mathematics, Statistics & Foundation Studies
Summary of Assessment Method:	Coursework (Time Constrained Assignment) & Examination

2. SHORT DESCRIPTION

The Unit examines some of the techniques of Management Science and uses them to solve a range of problems typically needing to be solved by managers who need to make decisions. The techniques used include linear programming, the use of appropriate probability models and a variety of decision-making criterion.

3. AIMS OF THE UNIT

The aim of this unit is to introduce a range of specific concepts and quantitative techniques essential for the management of operations, production, material planning and quality assurance functions. Managers are trained to make decisions. Making decisions is what they are paid to do. Some decisions are made based on 'intuition'. Others, such as deciding what combination of resources generates the maximum profit in a manufacturing system, will benefit from a more structured approach that makes use of the quantitative techniques introduced in this Unit.

Decisions are usually taken under one of three sets of conditions:- certainty, uncertainty and risk. This Unit will look at problems in all three of these.

4. LEARNING OUTCOMES

4.1 Knowledge and Understanding

- Identify situations where different probability models are appropriate and solve problems using these models.
- Carry out 1-sample hypothesis tests for means and proportions.
- Formulate and solve a number of resource allocation problems.
- Construct payoff and regret tables and use them with a variety of criteria to make decisions.
- Construct 'Decision Trees' to model the decision making process and use them to make decisions.
- Identify when a simulation is an appropriate method of solving problems and develop simple examples.

4.2 Intellectual Skills

- Appreciate the need for objective evidence to help support business decisions
- Identify the model appropriate for a given business problem.

4.3 Practical Skills

- Interpret computer software output to solve a variety of problems.

4.4 Transferable Skills

- All of the above

5. ASSESSMENT OF THE UNIT

The assessment will comprise 2 components:-

1. A timed constrained assignment in Session 8 covering the material introduced in Sessions 1 – 6. This will be open book and will carry a 20% weighting.
2. A 3-hour examination at the end of the semester covering ALL the material in the Unit. This will be closed book although two sides of A4 notes prepared by the student may be used. This will carry a 80% weighting.

To satisfy the examiners candidates must normally achieve an overall mark of 40%. A minimum mark of 30% will be required for each of the two elements above.

6. FEEDBACK

Feedback will normally be given to students 15 working days after the submission of an assignment.

7. INTRODUCTION TO STUDYING THE UNIT

7.1 Overview of the Main Content

The use of standard probability distributions such as the Normal, Binomial and Poisson distributions; the use of the Normal distribution in 1-sample hypothesis testing.

The tools of operational research. Formulating linear constraints and objective functions; where relevant reference will be made to the use of appropriate software packages and, in particular, the interpretation of the output produced by such packages will be examined.

Special cases of linear programming problems - the assignment and transportation problems. In these cases both maximisation and minimisation problems will be covered.

Payoff tables - the maximax, maximin, realism and expected value criteria. Regret tables - the minimax criterion.

Decision trees - the representation of complex decision making structures, expected value criterion and the value of information.

Simulations - manually constructed to model single and multi-server queues. Analysis of wait and idle times.

7.2 Overview of Types of Classes

The teaching strategy will be a mixture of formal lectures together with the opportunity to put into practice the principles and techniques acquired. During the taught sessions academic staff will be on hand to give help to individual students as and when needed. It is essential that students also complete the other exercises provided in the private study time. Success will **not** be achieved in this Unit just by reading about the subject. Success will **only** come by practising the various techniques introduced.

7.3 Importance of Student Self-Managed Learning Time

The importance of completing the examples set cannot be emphasised enough. Many of the examples are taken from past examination papers so answering them will give you a very good indication of the level of difficulty and style of question you can expect in the examination. It is not enough to understand how somebody else uses a technique; you must be able to use it yourself. If you are having problems with any of the questions set then you should (in the first instance) ask one of the tutors involved - the structure of the teaching sessions allows for plenty of opportunities to seek such help. In addition, the recommended texts contain a plentiful supply of worked examples of the types encountered in the Unit and students are strongly advised to make use of these.

8. THE PROGRAMME OF TEACHING, LEARNING AND ASSESSMENT

Session 1	-	The Assignment Problem
Session 2	-	The Transportation Problem
Session 3	-	Binomial Distribution
Session 4	-	Poisson Distribution
Session 5	-	Normal Distribution and 1-Sample Hypothesis Testing
Session 6	-	Linear programming (Graphical Method)
Session 7	-	Linear programming (Simplex Method)
Session 8	-	<i>Time Constrained Assignment (covering Sessions 1 – 6)</i>
Session 9	-	Simulations
Session 10	-	Payoff Tables
Session 11	-	Decision Trees
Session 12	-	Review and 'Catch-up'
Session 13	-	Revision (Optional)

It is important to note that, although it is intended to stick to this timetable, minor changes may take place from time to time to accommodate the learning patterns of the particular students involved.

9. LEARNING RESOURCES

Claire Morris	Quantitative Approaches in Business Studies (6th Edition) Prentice Hall, 2003
Donald Waters	Quantitative Methods for Business (3rd Edition) Prentice Hall, 2001
Louise Swift	Quantitative Methods for Business, Management & Finance (2 nd Edition) Palgrave, 2005
Bernard W. Taylor III	Introduction to Management Science (9th Edition) Prentice Hall, 2007

Although none of these books can be considered as essential to the course they all provide useful coverage of most of the topics covered as well as a further source of examples to practice.

Students who are considering taking the Management Science pathway in their final year will find it useful to look at (and even buy) the book by Taylor.

A Blackboard Site and CD-ROM revision materials are available for this Unit.

NOTES