

**WIDENER UNIVERSITY
SCHOOL OF BUSINESS ADMINISTRATION
GRADUATE PROGRAMS**

**QA 610 – QUANTITATIVE METHODS IN
MANAGERIAL DECISION MAKING**

Instructor: Dr. M. Williams **Summer 2003**
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COURSE DESCRIPTION:

This course is designed to provide the MBA students with essential quantitative methods in order to help them understand managerial decision processes and applications as well as formulating and solving problems for more effective decision-making. Topics will include statistical data analysis, forecasting techniques, decision theory, modeling, deterministic optimization and an introduction to project management.

COURSE PURPOSE:

The main purpose of this course is to provide a sound quantitative foundation for future managers in helping them make more effective decisions.

COURSE OBJECTIVES:

1. Provide a methodical survey for collection and analyzing statistical data used in decision process.
2. Understand the relationship among key variables and establish functional causality by using forecasting techniques.
3. Understand and differentiate various types of decision-making environments and choose the best approach for the problem under study.
4. Formulate the decision-making problems into models and use optimization techniques to obtain the best solution.
5. Review the time and project management concepts.
6. Provide cases and problems, which will be solved and analyzed by various computer packages.

PREREQUISITES: QA 500 and QA 501 or equivalent courses.

REQUIRED TEXTBOOKS:

D.R. Anderson, D.J. Sweeney, and T.A. Williams, *An Introduction to Management Science: Quantitative Approaches to Decision Making*, Tenth Edition, South-Western Publishing Company, New York, 2003.

COURSE OUTLINE:

I. ANALYSIS OF STATISTICAL DATA AND FORECASTING

1.1 Statistical Data Analysis

***Lecture Notes**

1.1.1. Introduction to Research Design

1.1.2. Introduction to Experimental Design

1.1.3. Sampling Procedures

1.1.4. Types of Sampling Plans

1.1.5. Descriptive Measures for Statistical Data

1.2 A Review of Probability Distributions and Statistical Inference

***Lecture Notes**

1.3 Forecasting Techniques

*** ASW Chapter 16**

1.3.1 The Components of a Time Series

1.3.2 Forecasting Using Smoothing Methods

1.3.3 Forecasting a Time Series Using Trend Projection

1.3.4 Forecasting a Time Series with Trend and Seasonal Components

1.3.5 Forecasting Using Regression Models

1.3.6 Qualitative Approaches to Forecasting

II. DECISION THEORY (4.5 hours)

***ASW Chapters 14 and 15**

2.1 Decision Making Under Uncertainty

2.2 Decision Making Under Certainty

2.3 Utility Theory and Decision Making

2.4 Introduction to Computer Simulation

III. MODELING AND DETERMINISTIC OPTIMIZATION

3.1 Introduction to Modeling

***Lecture Notes**

- 3.2 Linear Programming
 - * **ASW Chapters 2,3,4,5,6,7, and 8**
 - 3.2.1 Linear Programming: The Graphical Method
 - 3.2.2 Problem Formulation, Computer Solution, and Interpretation
 - 3.2.3 Linear Programming Applications
 - 3.2.4 The Simplex Method
 - 3.2.5 Sensitivity Analysis and Duality
 - 3.2.6 Transportation, Assignment and Transshipment Problems
 - 3.2.7 Integer Linear Programming

IV. AN INTRODUCTION TO PROJECT MANAGEMENT

- ***ASW Chapters 9, 10, and 13**
- 4.1 Critical Path Method
- 4.2 PERT
- 4.3 Other Project Monitoring Techniques
- 4.4 Budgeting and Cost Considerations
- 4.5 Introduction to Simulation

GRADING POLICY:

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|----------------------|------------|------------------------------|
| Midterm Exam | 40 percent | Week of June 16th |
| Final Exam | 40 percent | Week of July 29th |
| Computer Assignments | 20 percent | Due dates announced in class |

SKILLS OUTCOMES:

Communication Skills:

Skills In

- * Proficiency in writing

Skills Out

- * Ability to analyze information, formulate the appropriate model and describe the solution to a supervisor using non-quantitative language.

Computer Skills:

Skills In

- * Basic knowledge of Microsoft Word and Excel

Skills Out

- * Application of statistical and management science software for forecasting, decision analysis, and optimization.

Quantitative Skills:

Skills In

- * Background in basic statistics, algebra, and calculus

Skills Out

- * Ability to apply statistical methods to forecast and make effective managerial decisions.
- * Ability to use management science techniques for resource allocation problems

Teaching Technique:

Lectures, class discussions, and computer projects.

