

SYLLABUS

MATH 205 Advance Business Mathematics (3)

Duration: 1 Semester/45 hours

Credits: 3

Lecturer:

Email:

Course Prerequisites: none

Course Description

Mathematical models and data analysis are foundational within numerous disciplines of management thought. Whether the focus is on understanding the broad economic environment, carrying out market research, optimizing the supply chain, diversify in financial risk or another area of business practice. The requirement to be able to use analytical techniques is vital.

Course Objectives

This module advances existing quantitative skills to a level in which students can formulate, use and interpret mathematical models within a business context. An appreciation of the use of computer software to support such models is also developed.

Textbook required.

Qualitative Methods for Business – the A-Z of Qualitative Methods
Butter-Worth, Heinemann and Buglear (2004)

COURSE CONTENT AND WEEKLY LEARNING OBJECTIVES

Week One: Introductory management statistics

Content: Summary statistics
Data Types
Index numbers

Week Two: Probability distributions

Content: Simple probability review
Standard scores (Z-scores)
Probability distributions

Week Three: Inferential statistics 1

Content: Sampling distributions
Point estimates and confidence intervals
Introduction to hypothesis testing

Week Four: Inferential Statistics 2

Content: Hypothesis testing with a sample
Sampling approaches
Two sample t-test
Significance, error types, power
Frequency data and the χ^2 test

Week Five: Differentiation 1

Content: Gradient and the derivative
Rules of differentiation

Week Six: Differentiation 2

Contents: Partial differentiation
The total derivative

Week Seven: Regression analysis 1

Content: Pearson correlation
Simple linear regression
Spearman correlation

Week Eight: Midterm Examination**Week Nine: Regression analysis 2**

Content: Multiple regression analysis
Further regression models

Week Ten: Time series analysis

Content: Preparing time series for analysis
Time series decomposition
Additive and multiplicative models
Centred moving averages
Seasonal adjustment
Forecasting with time series
Exponential smoothing

Week Eleven: Linear Programming

Content: Formulating two variable linear programme
Graphical solution of a linear programme
Sensitivity analysis

Week Twelve: Group Research Presentation**Week Thirteen: Linear Programming with Solver routines**

Content: Multiple variable linear programme
Solving linear programmes with software
Interpreting the output
Extensions of linear programming: the integer programme

Week Fourteen: Decision tree analysis

Content: Formulating decision trees
Solving decision trees with rollback
Posterior probabilities within decision trees
Uncertainty

Week Fifteen: Final Examination