Aston Business School
Birmingham

BFM114 QUANTITATIVE METHODS FOR FINANCE

Academic Year 2011/12

Number of Aston Credits:	15
Number of ECTS Credits:	7.5

Staff Member Responsible for the Module:

Dr Dudley Gilder, Finance Accounting & Law Group
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Availability: See 'office hours'
Or contact the Finance, Accounting & Law Group Administrator:
Mrs Rosaleen Shirley, Room ABS 404, Extension 3238

Pre-requisites for the Module:

Students must be registered for the MSc in Finance and Investments or MSc in Investment Analysis

Mode of Attendance:

On Campus

Module Objectives and Learning Outcomes:

This module provides an understanding of the main mathematical, statistical and econometric techniques that underpin finance and investment models and their application in practice. Initially, mathematical methods will be reviewed, and this will be followed by coverage of statistical methods required for a good understanding of Econometrics. The module, indeed, will continue by providing a comprehensive introduction to Econometrics. Econometric applications to problems in finance and investment, by means of real-world data, are used throughout to begin to demonstrate the econometric techniques and models and to equip students for their dissertation.

On completing the module, students should be able to:

- Apply alternative mathematical functional forms to represent financial concepts and relationships;

- Understand and apply calculus and approximation techniques to financial problems;
- Use statistical techniques to analyse financial variables distributions;
- Understand relevant sampling theory and estimation theory;
- Understand and apply multiple regression analysis to financial variables;
- Understand the assumptions underlying regression analysis and their implications for the econometric modelling;
- Undertake an empirical project to test the existence of significant relationships between financial variables.

Module Content:

Week 1

Mathematical Review:
Functions (linear, quadratic, hyperbolic, exponential and logarithmic); Derivatives and rules of differentiation; Calculus of multivariable functions (Unconstrained and Constrained Optimization); Integral calculus (Indefinite and Definite integral).

Week 2

Statistical Concepts:
Descriptive Statistics (Frequency distributions; Measures of central tendency and dispersion; Shape of Frequency distributions).

Week 3

Probability and Probability distributions (Probability of a single event and of multiple events; Bayes' theorem, Probability density functions of continuous and discrete random variables and their characteristics; Normal, Chi-Square, t, F, Binomial and Poisson probability distributions; Estimation and Hypothesis Testing).

Week 4

Econometrics:
Single-Equation Regression Models (The meaning of Regression Analysis; Two-Variable Regression model and the problem of estimation; CNLRM).

Week 5

Econometrics:
Single-Equation Regression Models (Two-Variable Regression: interval estimation and hypothesis testing, Multiple Regression analysis: problems of estimation and inference).

Week 6

Econometrics:
Single-Equation Regression Models (Dummy Variable Regression models; Relaxing the assumptions of the Classical Linear Regression Model - Model Specification and Diagnostic Testing).

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Week 7	**Econometrics:** Relaxing the assumptions of the Classical Linear Regression Model (Multicollinearity; Heteroscedasticity; Autocorrelation).
Week 8	**Eviews and SPSS applications** Descriptive Statistics and Models' Estimators.
Week 9	**Revision**
Week 10	**Examination**

Corporate Connections:

The module will draw on the experience of investment professionals whenever possible.

International Dimensions:

In the presence of global financial markets, the study of finance and investments naturally transcends national boundaries. Quantitative methods are applicable regardless of setting, and this module will involve the analysis of financial variables from a variety of countries.

Contribution of Research:

This module will draw on the wealth of experience and work of the module coordinator in modelling financial market variables.

Method of Teaching:

Classroom-based teaching and learning will comprise both lectures and practical classes to a total of 3 hours per week. The lectures will be the initial mode of delivery of the knowledge required to achieve the learning outcomes. The practical classes will provide an opportunity to put into practice the knowledge acquired in the lectures, and prepare for the assessed work. In addition to formal class contact hours, students are expected to follow the suggested learning hours guide, in allocating time for private study.

Method of Assessment and Feedback:

This module will be assessed by a 2 hour closed-book exam.

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Learning Hours:

Contact Hours	30	
Further Private Study		70
Direct Reading	50	
Total		**150**

Essential Reading:

The core texts for this module are:

[WP] Watsham, T., and Parramore, K. (2007), Quantitative Methods in Finance, Thomson Learning, 1st Edition.

[SH] Sydsaeter K., and Hammond P. (2008), Essential Mathematics for Economic Analysis, FT Prentice Hall, 3rd Edition.

[G] Gujarati, D. (2003), Basic Econometrics, McGraw-Hill, 4th Edition.

[B] Brooks, C. (2008), Introductory Econometrics for Finance, Cambridge University Press, 2nd Edition.

Indicative Bibliography:

Useful supplementary texts for Econometrics are:

Gujarati, D., and Porter, D. (2009), Basic Econometrics, McGraw-Hill, 5th Edition.

Maddala, G. (2006), Introduction to Econometrics, MacMillan, 3rd Edition.

Useful supplementary texts for Quantitative Methods are:

Anthony M., and Biggs, N. (2008), Mathematics for Economics and Finance, Cambridge University Press, 1st Edition.

Copeland, T., and Weston, J. (1988), Financial Theory and Corporate Policy, Addison-Wesley, 3rd Edition (esp., chapters 2, 4, 5, 6, 7).

Hill R.C., Griffiths W., and Judge, G. (2001), Using Eviews for Undergraduate Econometrics, Wiley & Sons, 2nd Edition.