

MODULE SPECIFICATION – UNDERGRADUATE PROGRAMMES

KEY FACTS

Module name	Mathematical Finance
Module code	FR2200
School	Cass Business School
Department or equivalent	UG Programme
UK credits	15
ECTS	7.5
Level	5
Delivery location (partnership programmes only)	

MODULE SUMMARY

Module outline and aims

Finance/banking students and practitioners need mathematical tools such as calculus and optimization methods for asset allocation, valuation and utility maximization. This module aims to provide you with a sound basis of the methods and techniques employed in modern financial/economic theory to enable you to formulate and solve optimization problems using a range of approaches. The module covers both the mathematical tools required and selected applications.

This module aims to introduce you to the methods and tools required to handle a variety of financial problems, familiarize you with optimization methodologies used in finance/economics, including optimization under different constraints, as well as the necessary matrix manipulations necessary to formulate optimization problems, and equip you with the technical skills needed to value investment flows and money market instruments.

Content outline

- Matrix Algebra
- Differential Calculus
- Uses of the Derivative and Optimization
- Calculus of Multivariate Functions
- Optimization of Multivariate Functions in Economics and Finance
- Constrained Optimization in Economics and Finance
- Integral Calculus and Application to Financial Problems
- Difference and Differential Equations

WHAT WILL I BE EXPECTED TO ACHIEVE?

On successful completion of this module, you will be expected to be able to:

Knowledge and understanding:

- Formulate and solve problems in finance/economics using a range of mathematical techniques
- Identify the range of more advanced mathematical modelling techniques

Skills:

- Use optimization methodologies and matrix algebra
- Solve problems in portfolio selection, utility maximization, bond pricing, dynamic systems, difference and differential equations

Values and attitudes:

- Analyse the implications of correctly using mathematical finance approaches for portfolio management, asset allocation and other areas in banking and finance

HOW WILL I LEARN?

A variety of learning and teaching methods will be used in this course.

Lectures are used to introduce context, concepts and techniques illustrated with practical and current examples. You will also have the opportunity to participate in class discussions and work through examples and exercises with the support of the lecturer. It is strongly recommended that you attend ALL lectures.

Tutorials are used to explore the concepts and practices covered in the lectures in more detail. Specifically, they are used primarily to demonstrate technical material, although some discussion and analysis will accompany the practical techniques. Tutorials take place in smaller groups and you are expected to interact with the tutor and other students.

Key learning and teaching resources will be put on the module website on Moodle.

In the independent study time you are encouraged to read widely and in depth around particular topics in preparation for lectures and tutorials. You may also spend time working through sample exercises and questions. In addition you will be preparing and undertaking your coursework assignments and preparing for your final examination.

Teaching pattern:

Teaching component	Teaching type	Contact hours	Self-directed study hours	Placement hours	Total student learning hours
Lectures	Lecture	22	115	0	137
Tutorials	Tutorial	5	8	0	13
Totals		27	123	0	150

WHAT TYPES OF ASSESSMENT AND FEEDBACK CAN I EXPECT?

Assessments

Assessment is based on a written examination and a group coursework. The coursework is highly empirical, and you will have to apply your quantitative skills to demonstrate a sufficient understanding of the issues analyzed during the course.

Assessment pattern:

Assessment component	Assessment type	Weighting %	Minimum qualifying mark	Pass/Fail?
Coursework	Written assignment, including essay	30	40	N/A
Exam – 2.25 hours	Written Exam	70	40	N/A

Assessment criteria

Assessment criteria are descriptions of the skills, knowledge or attributes you need to demonstrate in order to complete an assessment successfully and Grade-Related Criteria are descriptions of the skills, knowledge or attributes you need to demonstrate to achieve a certain grade or mark in an assessment. Assessment Criteria and Grade-Related Criteria for module assessments will be made available to you prior to an assessment taking place. More information will be available in the UG Assessment Handbook and from the module leader.

Feedback on assessment

Following an assessment, you will be given your marks and feedback in line with the University's Assessment Regulations and Policy. More information on the timing and type of feedback that will be provided for each assessment will be available from the module leader.

Assessment Regulations

The Pass mark for the module is 40%. Any minimum qualifying marks for specific assessments are listed in the table above. The weighting of the different components can also be found above. The Programme Specification contains information on what happens if you fail an assessment component or the module.

INDICATIVE READING LIST

Although the lecture notes should be sufficient for the purposes of this course, the following references provide a general guideline to the topics covered.

Chiang A.C. (2005) *Fundamental Methods of Mathematical Economics*. McGraw-Hill.

Budnick F.S. (1993) *Applied Mathematics for Business, Economics, and the Social Sciences*. McGraw-Hill.

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For use from: 2016-17

Appendix: see <http://www.hesa.ac.uk/content/view/1805/296/> for the full list of JACS codes and descriptions

CODES		
HESA Code	Description	Price Group
133	Business and Management Studies	D
JACS Code	Description	Percentage (%)
N300	The study of financial systems, regulations and reporting.	100