Programme Specification

1 Awarding institution:	University of Newcastle upon Tyne
2 Teaching institution:	University of Newcastle upon Tyne
3 Final award:	M.Sc./Diploma
4 Programme title:	Financial Mathematics with Management
5 Accrediting Bodies:	None
6 UCAS Code:	
7 QAA Benchmarking Groups:	
8 Date of production/revision:	23 August 2004

9 Programme Aims:

- To provide a modern introduction to advanced financial mathematics and management.
- To provide the knowledge required to tackle practical and theoretical problems in financial mathematics.
- To provide an understanding of the processes of business management.
- To provide an understanding of model assumptions and when they are violated.
- To develop and improve mathematical skills including the pricing and hedging of financial instruments.
- To develop and improve skills in written and oral communication.
- To provide the knowledge to be able to embark on the research literature in the field.
- To provide the knowledge to be able to use information technology in this area.
- To equip students with the knowledge and skills to apply mathematics and statistics in the business world.
- To provide a sound grounding in some key aspects of management.
- To give a broad understanding of the business world.
- To provide an understanding of marketing, operations management, human resource management and business strategy.
- To equip students with the knowledge and skills required to work in banking and finance or areas within management which require good quantitative skills.
- To prepare students to enter the international labour market.

10 Intended Learning Outcomes

A. Knowledge and Understanding:

At the end of the course students will be expected to have:

A1. The knowledge and experience to tackle practical and theoretical problems in financial mathematics.

A2. An advanced understanding of the major processes of business management in an international environment.

A3. The ability to embark on the research literature in the field.

A4. Familiarity with some relevant information technology.

A5. Advanced knowledge and understanding of chosen specialist areas in financial mathematics.

A6. An understanding of model assumptions and when they are violated.

A7. Knowledge of the techniques used in the pricing and hedging of financial instruments.

A8. Knowledge to apply mathematics and statistics in the business world.

A9. An understanding of the principles of management and organisations with some reference to relevant research findings.

A10. An understanding of issues and problems appropriate to business management.

Mapping Teaching and Learning Strategies and Methods

Acquisition of A1-A10 is through a combination of lectures, coursework in all modules and, for MSc students, research projects.

Throughout the learner is encouraged to undertake independent reading both to supplement and consolidate what is being taught/learnt and to broaden their individual knowledge and understanding of the subject.

Assessment Strategies and Methods

Testing the knowledge base is through a combination of unseen written examinations (A1-A10), MSc projects and assessed coursework (A1-A10) in the form of projects, homeworks and programming exercises.

B. Subject Specific/Professional Skills:

Students will be able to:

B1. Apply their knowledge of financial mathematics to financial problems.

B2. Have expertise in the use and application of programming languages and software to financial problems.

B3. Perform management tasks required to support research in financial business and the international market.

B4. Analyse business information and operations for management decision making.

B5. In addition, students graduated with MSc, will be able to propose, carry out and write up an extended research project involving a literature review, modelling and analysis.

Mapping Teaching and Learning Strategies and Methods
Acquisition of B1-B5 is through a combination of lectures, coursework in all modules and, for MSc students, research projects.

Assessment Strategies and Methods
Testing the knowledge base is through a combination of unseen written examinations (B1-B5), MSc projects and assessed coursework (B1-B5) in the form of projects, homeworks and programming exercises.

C. Cognitive Skills:

At the end of the course students will have:

C1. A facility for mathematical and statistical thinking.

C2. Numerical and computational skills.

C3. The skill to formulate complex financial issues in a quantitative way.

C4. The skill to present, store and handle complex data sets.

C5. The skill to present their work in financial mathematics.

C6. Skill in the organisation and interpretation of data.

C7. The ability to draw conclusions from data supplied to the student or acquired by the student.

Mapping Teaching and Learning Strategies and Methods
Acquisition of C1-C7 is through a combination of lectures, coursework in all modules and, for MSc students, research projects.

Assessment Strategies and Methods
Testing the knowledge base is through a combination of unseen written examinations (C1-C7), MSc projects and assessed coursework (C1-C7) in the form of projects, homeworks and programming exercises.

D. Key (transferable) Skills:

The programme provides opportunities for students to develop

D1. Their ability to communicate orally in English;

D2. Their written communication skill;

D3. An ability to use computer-based information resources;

D4. An ability to do research independently for students graduated with MSc;

D5. IT literacy.

Mapping Teaching and Learning Strategies and Methods
Acquisition of D1-D5 is through a combination of lectures, coursework in all modules and, for MSc students, research projects.

Assessment Strategies and Methods
Testing the knowledge base is through a combination of unseen written examinations (D1-D5), MSc projects and assessed coursework (D1-D5) in the form of projects, homeworks and programming exercises.

11 Programme Features, Curriculum, and Structure:

The Programme will be regulated by the Board of Studies in Financial Mathematics, which will be convened by the Director of Teaching in the School of Mathematics and Statistics, or his nominee. The membership of the Board will comprise all academic staff involved in the delivery of the programme and will include a representative of the Business School nominated by the Head of the Business School.

(i) Programme Features:

(a) the duration of the course: one year

(b) where appropriate, the number of Stages: one

(c) the overall credit arrangements:
The MSc comprises 120 credits of core and optional taught modules and a dissertation worth a further 60 credits making 180 credits in total. The students take 80 credits of Mathematics and Statistics modules and 40 credits of Business School modules.

The Diploma comprises 120 credits of core and optional taught modules.

(d) the module credit arrangements: see below the list of modules.

(e) requirements for progression
Requirements for progression are as detailed in the University Degree Programme Regulations and Examination conventions.

(f) any innovative features of the course:
This degree scheme will introduce students to the application of advanced mathematical and statistical techniques to finance and will equip students with the knowledge and skills to apply mathematics and statistics in the business world and to work in banking and finance or areas within management which require good quantitative skills.

(ii) Curriculum and Structure:

(a) All students will normally take the following compulsory modules from Mathematics and Statistics (but see (d) below):

Module code:	*Credit:*	*Descriptive Title*
MAS867	10	Introduction to Financial Mathematics
MAS857	10	Time Series and Forecasting
MAS858	10	Financial Modelling
MAS842	15	Stochastic Calculus and Finance
MAS863	15	Risk Analysis in Finance and Insurance

together with the following compulsory modules from the Business School:

Module code:	*Credit:*	*Descriptive Title*
NSM793	10	Accounting for Managers
NSM936	10	International Business Strategy

(b) All candidates will select modules to a total credit value of 20 credits from the following list of modules from Mathematics and Statistics:

Module code:	*Credit:*	*Descriptive Title*
MAS823	10	Further Modelling
MAS824	10	Modern Computer Methods
MAS829	10	Numerical Recipes

together with modules to a total credit value of 20 credits from the following list in the Business School:

Module code:	*Credit:*	*Descriptive Title*
NSM801	10	International Business Environment
NSM803	10	Marketing
NSM910	10	Managing HR for Competitive Advantage
NSM937	10	Managing Across Cultures
NSM837	10	Managerial Economics
NSM903	10	International Marketing

(c) MSc candidates will take the compulsory 60 credit module MAS802 Financial Mathematics Project.

(d) Note that graduates of the School of Mathematics and Statistics of Newcastle University who have previously studied any of the following modules in their undergraduate degree:

Module code:	*Credit:*	*Descriptive Title*
MAS667	10	Introduction to Financial Mathematics
MAS323	10	Further Modelling
MAS357	10	Time Series and Forecasting
MAS358	10	Financial Modelling
MAS329	10	Numerical Recipes

cannot take those modules again and must substitute, as appropriate, other MAS modules selected from the following list of modules offered by the School of Mathematics and Statistics. Modules in the list below may also be selected by other students with the agreement of the Degree Programme Director.

Module code:	*Credit:*	*Descriptive Title*
MAS313	10	Numerical and Computational Modelling
MAS329	10	Numerical Recipes
MAS336	10	Linear Systems
MAS344	10	Linear Analysis
MAS348	10	Measure Theory
MAS352	10	Techniques of Regression
MAS653	10	Programming for Mathematics
MAS354	10	Bayesian Statistics
MAS362	10	An Introduction to Statistical Modelling

Intended Learning outcomes

Module code:	Status	Intended Learning outcomes
MAS823	op	A1, A3, A4, A5, A6, A7, A8, B1, B2, C1, C2, D2, D3, D5
MAS857	cp	A1, A3, A5, A6, A7, A12, B1, C1, C2, C3, D2
MAS858	cp	A1, A3, A5, A6, A7, A8, A12, B1, C1, C2, C3, C5, C6, C7, D2, D5
MAS829	op	A1, A3, A4, A6, A7, A9, B2, C1, C2, C3, C5, C6, C7, D2, D3, D5
MAS824	op	A3, A4, B2, D3, C1, C2, C6, D2
MAS842	cp	A1, A3, A5, A6, A7, B1, C1, C2, C3, C5, C6, D2
MAS863	cp	A1, A3, A5, A6, A7, B1, C1, C2, C3, C5, C6, C7, D2
MAS867	cp	A1, A3, A5, A6, A7, A8, B1, C1, C2, C3, D2
MAS8proj	cp	A1, A3, A5, A6, A7, A8, B1, B5, C1, C2, C3, C7, D1, D2, D4
NSM797	cp	A1, A3, A5, A8, A9, A10, B1, B3, B4, C4, C5, C6, C7, D2, D5
NSM801	op	A2, A3, A9, A10, B3, B4, C4, C5, D2
NSM803	op	A2, A3, A8, A9, A10, B3, C5, C7, D2, D5
NSM910	op	A2, A3, A9, A10, B3, B4, C4, C5, D1, D2
NSM936	cp	A2, A3, A9, A10, B3, B4, C5, D1, D2

NSM937	op	A2, A3, A9, A10, B3, C5, D1, D2
NSM837	op	A2, A3, A8, A9, A10, B1, B2, B3, B4, C4, C5, C6, C7, D1, D2, D5
NSM903	op	A2, A3, A9, A10, B3, B4, C4, C5, C6, C7, D1, D2

where their status (cp) means compulsory, (cr) means core, and (op) means optional.

12 Criteria for Admission:

First degree at second class or above in Mathematics and/or Statistics or combined degree in Maths/Stats with other subjects from a UK University (or equivalent from a non-UK institution).

English language competence: overseas applicants should have, or expect to obtain, an IELTS score of 6.5 or above or a TOEFL score of 575 or above. Pre-sessional courses and tests in English Language are provided by the University and successful completion of these may be a condition of entry.

Applications

An academic member of the admissions staff considers each application. On the basis of this information it is decided whether to offer the applicant a place and if so what the terms of the offer are to be. Offers are intended to indicate a minimum standard that we require of our new students and are the primary mechanism by which we control the quality of our intake. Mature students, or those with non-standard qualifications, are interviewed whenever this is practical (by telephone if necessary) before any offer is made. Once a decision has been made the applicant is informed by letter.

13 Support for Students and their Learning:

Induction

The School provides a comprehensive induction programme for new students, which introduces the facilities for study available both at University (Library, Careers, Counselling, Language Centre, Students Union, Chaplaincy, Medical Practices) and School level. On acceptance, students are sent a copy of the student handbook and its contents are discussed with them at induction. Students are also offered general advice about the course structure. The handbook includes information about the School and on the respective roles and responsibilities of staff and students. In other sessions, guidance is given on study skills and IT skills.

Further detailed advice about the course is available during Induction Week at the start of the academic year. Students also discuss their choices with their personal tutors and, where necessary, with the Degree Programme Director.

Academic and Pastoral Support

General help on academic problems is available in class tutorials and from lecturers individually.

Each student has a personal tutor who is responsible for providing access to pastoral care. Students identified on entry as requiring particular support (e.g. mature students, international students, students with disabilities, or those with an unusual background) are assigned to more experienced tutors. Students following similar routes through the School of Mathematics and Statistics are assigned to specific tutors, in order to benefit from the tutor's knowledge of the special circumstances in which these students find themselves. Support for students who

encounter serious personal difficulties is provided by the University's Student Counselling Service.

Monitoring Student Progress

The performance of all students is carefully monitored. Records of work handed in and marks obtained on all modules are held by the Degree Programme Directors.

The progress of all students is reviewed regularly by the DPD. Personal tutors are advised when a tutee's progress is giving cause for concern.

Learning Resources: Physical

Most lectures take place in Merz Court. The lecture and tutorial rooms within the School are of a good standard and suitable for their purpose.

The computer cluster in Merz Court was recently extended and upgraded by the University Computing Service, supported by a major financial contribution from the School. It now houses 40 fast PCs (running Windows) and 2 laser printers. It is conveniently situated within the School and is used as the primary teaching laboratory for practical classes. Students also have access to the cluster when carrying out assignments and for general IT purposes, such as word-processing, in addition to other PC clusters in neighbouring buildings and the library.

The cluster provides access to campus-wide facilities such as the central file space servers, electronic mail and the internet. Extensive software is available, ranging from the general, such as standard Microsoft applications (Word, Excel etc.), to the technical, such as the statistical package Minitab and the general symbolic algebra package Maple. The School works closely with the University Computing Service to ensure that the necessary software and data sets used in our modules are accessible from any cluster including the Halls of Residence. A teaching room in the School has been designated as a reading room for private study by students, when it is not otherwise required for teaching; this facility is well-used. Students have access to a full-range of library services provided by the award-winning Robinson library.

Learning Resources: Staff

The academic staff are the primary teaching and learning resource. Staff have a wide range of experience in Mathematics and Statistics. Some staff also have extensive industrial and consultancy experience. This expertise informs our teaching. All experienced staff act as personal tutors to students.

The academic staff and students are supported by the clerical staff in the General Office. The secretaries deal with many student enquiries on a day-to-day basis and they provide a helpful and friendly service.

The Computer Officer is responsible for maintaining the School's computing facilities and in advising on the purchase of hardware and software.

14 Methods for evaluating and improving the quality and standards of teaching and learning

Module reviews
All modules are subject to review by questionnaires which are considered by the Board of Studies. Changes to, or the introduction of new, modules are considered at the School Teaching and Learning Committee and at the Board of Studies. Student opinion is sought at the Staff/Student Committee and/or the Board of Studies. New modules and major changes to existing modules are subject to approval by the Faculty Teaching and learning Committee.

Programme reviews
The Board of Studies conducts an Annual Monitoring and Review of the degree programme and reports to Faculty Teaching and Learning Committee.

External examiner reports
External Examiner reports are considered by the Board of Studies under Reserved Business, in the absence of the student representatives. The Board responds to these reports through Faculty Teaching and Learning Committee.

Student evaluations
All modules, and the degree programme, are subject to review by student questionnaires. Informal student evaluation is also obtained at the Staff/Student Committee, and the Board of Studies.

Feedback mechanisms
Feedback to students is effected via the Staff/Student Committee and the Board of Studies.

Faculty and University Review Mechanisms
The Programme is subject to the University's Internal Subject Review programme which occurs approximately every 5 years

15 Regulation of Assessment

The Programme will be regulated by the Board of Examiners in Financial Mathematics, which will be convened by the Director of Teaching in the School of Mathematics and Statistics, or his nominee. The membership of the Board will comprise all academic staff involved in the delivery of the programme and will include a representative of the Business School nominated by the Head of the Business School.

Pass Marks
The pass mark, as defined in the University's Examination Conventions for Taught Postgraduate Students is 50.

Course Requirements
Progression is subject to the University's Taught Postgraduate Masters' Degree Entrance and Progress Regulations and University's Examination Conventions for Taught Postgraduate Students. Limited compensation down to 40 and resit opportunities are available, with certain restrictions.

Common Marking Scheme
The University employs a common marking scheme, which is specified in the University's Examination Conventions for Taught Postgraduate Students, namely

<50	Fail
50-59	Pass
60-69	Pass with Merit
70+	Pass with Distinction

Role of the External Examiner
An External Examiner, a distinguished member of the subject community, is appointed by Faculty Teaching and Learning Committee, after recommendation from the Board of Studies. The External Examiner is expected to:

See and approve examination papers
Moderate examination and coursework marking
Attend the Board of Examiners
Report to the University on the standards of the programme

16 Indicators of Quality and Standards:

The School of Mathematics and Statistics was awarded an excellent 23 out of 24 points in the QAA Subject Review in 2000. We were particularly commended for excellent teaching, student support and guidance, learning resources, and for having a well structured curriculum.

In the 2001 Research Assessment Exercise, the Statistics and Pure Mathematics submissions were each awarded 5, and the Applied Mathematics submission was awarded 4.

Warning

This specification provides a concise summary of the main features of the programme and of the learning outcomes that a typical student might reasonably be expected to achieve if she/he takes full advantage of the learning opportunities provided. The accuracy of the information contained is reviewed by the University and may be checked by the Quality Assurance Agency for Higher Education.

In addition, information relating to the course is provided in:
* The University Prospectus: http://www.ncl.ac.uk/postgraduate/
* The School Prospectus
* The University and Degree Programme Regulations
* The Degree Programme Handbook
* QAA Subject Review Report