The University Of Sheffield.

Programme Specification

A statement of the knowledge, understanding and skills that underpin a taught programme of study leading to an award from The University of Sheffield

Programme Details

1. Programme title	Statistics with Financial Mathematics
2. Programme code	MAST11, MAST12
3. QAA FHEQ level	Masters (FHEQ Level 7)
4. Faculty	Science
5. Department	School of Mathematics and Statistics
6. Other departments providing credit bearing modules for the programme	None
7. Accrediting Professional or Statutory Body	Royal Statistical Society
8. Date of production/revision	December 2019, July 2020, September 2022

Awards	Type of award	Duration
9. Final award	MSc	1 year (MAST11), 2 years (MAST12)
10. Intermediate awards	PG Diploma	
	PG Certificate	

Programme Codes

11. JACS code(s) *Select between one and three codes from the HESA website.*	G300		
12. HECoS code(s) *Select between one and three codes from the HECoS vocabulary.*	100401	100406	

Programme Delivery

13. Mode of study	Full time (MAST11), Part time (MAST12)
14. Mode of delivery	In person

15. Background to the programme and subject area

In recent years a new area of application of probabilistic, statistical and mathematical techniques has emerged in finance, leading to rapid advances in optimal investment, risk management and the pricing of options and derivatives. The new area has seen major development, much of it in the UK, stimulated by the needs of the country's financial services industry, which is of global as well as national importance. There is a substantial demand for high-quality postgraduate training in this area, including demand for such training in part-time distance-learning form.

The MSc in Statistics with Financial Mathematics provides both a practically-based professional training combining statistics and financial mathematics, and a foundation for those wishing to pursue further research. It is available via distance-learning (2-3 years, part-time) as well as by residential study (1 year full-time). The programme is a development of that leading to the MSc in Statistics, which has been running successfully for many years. It builds on the provision of a firm grounding in practical statistical methodology and computation, including the development of the personal skills in demand by employers, from the established Statistics MSc programme, and adds to them development of an understanding of, and ability to apply, the concepts, models and tools of modern mathematical finance. It provides an excellent foundation for a career in financial areas, or for further study for a research degree.

The MSc is accredited by the Royal Statistical Society. The Society accords GradStat status with one year's relevant experience towards CStat status to all students who pass the course.The programme is kept in close touch with the needs of employers through the programme's Advisory Board, whose members are drawn from industry, commerce and government. Students benefit from contacts with members of the Board, from meetings with employers through open days, from career presentations and through work on dissertation projects arising from commerce and industry. The School has an international reputation in research, with 96% of research activities being rated as world leading or internationally excellent in the 2021 Research Excellence Framework exercise. Students can be confident that the training offered by the programme is informed by the latest thinking in the subject.

Further information is available from the School web site:
http://www.sheffield.ac.uk/maths/prospectivepg/taughtpg/statistics

16. Programme aims

MSc Statistics with Financial Mathematics aims to:	
A1	provide a high-quality thorough initial training for professional statisticians with a strong interest in quantitative finance;
A2	provide an intellectual environment conducive to learning;
A3	prepare students for careers which use their statistical and financial-mathematical training;
A4	provide teaching which is informed and inspired by the research and scholarship of the staff;
A5	provide students with assessments of their achievements, and to identify and support academic excellence.

17. Programme learning outcomes

Knowledge and understanding On successful completion of the programme, students will be able to demonstrate knowledge and understanding of:		
		Links to Aim(s)
K1	statistical theory, including Bayesian and frequentist approaches for statistical inference;	1-5
K2	a wide variety of statistical modelling techniques;	1-4
K3	computational methods for implementing statistical analyses;	1, 3-5
K4	at least one statistical computing language;	1, 3
K5	the application of mathematics and statistics in finance.	1-4
Skills and other attributes On successful completion of the programme, students will be able to:		
S1	identify and implement an appropriate statistical modelling method, when presented with a data analysis problem;	1-3
S2	produce written reports which describe statistical analyses and present the findings;	1-5
S3	use appropriate software for analysing data, implementing statistical modelling methods, and preparing written reports;	1-3, 5
S4	communicate the results of statistical analyses to non-expert audiences;	1, 3, 5
S5	plan and complete an extended individual study of a statistical problem and to present the results in a dissertation;	1-5
S6	apply suitable mathematical and statistical techniques in problems related to the pricing of financial instruments.	1-4

18. Learning and teaching methods

Development of the learning outcomes is promoted through the following teaching and learning methods:

MAST11 is a full-time residential programme, with lectures, MAST12 is a part-time distance learning programme. They are as closely integrated as possible within the constraints this difference imposes. The distance learning version is designed so that students study the same subjects as their residential counterparts essentially concurrently.

Blackboard
The course materials are made available through Blackboard and support is available from a designated personal tutor from the individual module lecturers and from the course's Course Director via email or telephone. Most communication within the course, particularly between residential and distance-learning students, takes place via Blackboard and so training in its use is given early in the MSc.

For all modules (except the dissertation module) students are provided with module notes, structured problems and a schedule of work. The Blackboard discussion board is the main vehicle for academic interaction. It also serves to keep distance-learning students exactly in step with the

delivery of material in Sheffield. (K1-K5).

Independent Learning
This is the cornerstone of success in the programme. It is vital for the assimilation of the material provided, for the preparation of written reports, and other presentations, and for the proper use of sophisticated software (K1-K5).

Lectures
A 15-credit lecture-module generally comprises about 20 lectures. In lectures the important points in the lecture notes are explained and illustrated, with computer demonstrations when appropriate. The Blackboard discussion board is used to keep distance-learning students up-to-date with what has been covered and highlight any special points made during lectures. (K1-5, S1, S3, S6). In every module, some lectures will include discussion and demonstration of presenting statistical concepts to non-expert audiences (S4).

Computing classes
A number of classes are held in computer labs, where students can learn and practise statistical computing. Demonstrators are available in the classes to help students with any questions or problems (K3, K4, S3).

Formative assessment
All modules (with the exception of the dissertation module) include sets of non-assessed exercises. Students can hand in their work and receive feedback on their solutions. Model solutions are provided for these exercises (K1, K2, S1, S6).

Project work and feedback
Students will complete a number of projects over the MSc, and will receive feedback on both technical aspects particular to the project, and presentation themes that are common to all projects (S1-S4).

Dissertation
Teaching for the dissertation is through supervision by one or more members of School staff. Students will experience the key phases of a relatively large piece of work: planning to a deadline; researching background information; acquisition and validation of data; problem specification; carrying out of relevant analyses; and reporting at length through the dissertation. Dissertation topics may be provided by external clients, and learning to communicate with, and relate to, these clients is an extra benefit of the dissertation; for distance learning students, projects based in the workplace in co-operation with an employer are encouraged. (K1-K5, S4-S6).

Personal Tutorials

The Department runs a personal tutorial system conforming to the guidelines in the University's Students' Charter. The system is essentially pastoral; tutors are available to provide personal support and general academic guidance.

19. Assessment and feedback methods

Project work, requiring report-writing and statistical computing K1-K4, S1-S4.

Examinations, which are held in May/June, K1-K3, K5, S1, S6.

Dissertation K1-K5, S1, S3-S6.

20. Programme structure and student development

All students must take 120 credits of theoretical modules, taken from statistics, data science, machine learning, and financial mathematics, and then complete a Dissertation (60 credits).

For residential students the dissertation is mainly prepared during the summer. The arrangement for part-time students is more flexible but it is expected that they too will do most of the work during the summers or in the year after they have completed all the other modules.

Successful completion of the programme leads to the award of the MSc with either 'pass', 'pass with merit' or 'pass with distinction' grade.

Some modules form a statistical ‘core’, and will equip students with essential modelling, computational and professional skills. These will include linear and generalised linear modelling, exploratory data analysis and statistical computing using R, Bayesian inference and Monte Carlo methods, and presentation skills. Students will have the knowledge and confidence to tackle a wide range of data analysis problems, and, when confronted with ‘non-standard’ problems, make use of computational methods and/or simple exploratory approaches as appropriate.

There are specialised modules which introduce various concepts from finance (in particular, the pricing of financial derivatives), together with appropriate mathematical and statistical tools, and students will learn how to apply mathematical and statistical ideas in the financial domain.

Finally, students may develop more specialised statistical knowledge in modules on machine learning and time series, in particular learning further techniques that can be applied to finance.

The dissertation draws on the knowledge and skills acquired in the remainder of the programme. The dissertation will be on a financial topic, enabling students to consolidate their knowledge, and do further independent study at the interface of mathematics/statistics and finance.

Detailed information about the structure of programmes, regulations concerning assessment and progression and descriptions of individual modules are published in the University Calendar available online at http://www.sheffield.ac.uk/calendar/.

21. Criteria for admission to the programme

The minimum entrance requirement for the course is:

Either a 2.1 Honours Degree, from a three or four year course at a UK university, with substantial mathematical and statistical components; or any comparable qualification of equivalent standard.

In addition, students whose first language is not English will need to demonstrate English language proficiency (even if their education has been chiefly in English). Our usual minimum requirements are: TOEFL 232 (computer-based) or 575 (paper-based), IELTS 6.5, or equivalent.

Detailed information regarding admission to the programme is available at http://www.shef.ac.uk/study/Detailed information regarding admission to programmes is available from the University’s On-Line Prospectus at http://www.shef.ac.uk/courses/.

22. Reference points

The learning outcomes have been developed to reflect the following points of reference:

Subject Benchmark Statements
https://www.qaa.ac.uk/quality-code/subject-benchmark-statements

Framework for Higher Education Qualifications (2014)
https://www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf

University Strategic Plan
http://www.sheffield.ac.uk/strategicplan

Learning and Teaching Strategy (2016-21)
https://www.sheffield.ac.uk/polopoly_fs/1.661828!/file/FinalStrategy.pdf

23. Additional information

This specification represents a concise statement about the main features of the programme and should be considered alongside other sources of information provided by the teaching department(s) and the University. In addition to programme specific information, further information about studying at The University of Sheffield can be accessed via our Student Services web site at http://www.shef.ac.uk/ssid.