

## PROGRAMME SPECIFICATION

Name, title and level of final qualification(s)	<b>MSc Applied Statistics and Financial Modelling</b> (Level 7)
Name and title of any exit qualification(s)	PG Dip Applied Statistics and Financial Modelling PG Cert Applied Statistics
Awarding Body	University of London
Teaching Institution(s)	Birkbeck, University of London
Home School/other teaching departments	School of Computing and Mathematical Sciences
Location of delivery	Central London
Language of delivery and assessment	English
Mode of study, length of study and normal start month	Full-time (1 year) Part-time (2 years) September
Professional, statutory or regulatory body	<a href="#">Royal Statistical Society</a>
<a href="#">QAA subject benchmark group(s)</a> <a href="#">Higher Education Credit Framework for England</a>	Mathematics, Statistics and Operational Research
Birkbeck Course Code	TMSASFMO_C
HECoS Code	101030
Start date of programme	Prior to 2008/09
Date of programme approval	Prior to 2008/09
Date of last programme amendment approval	May 2023
Valid for academic entry year	<b>2025-26</b>
Date of last revision to document	17/05/2023

## **Admissions requirements**

A second-class honours degree (2:2) or above, with Mathematics or Statistics as a main subject.

Other degrees or professional qualifications may also be acceptable, such as the Birkbeck Graduate Certificate in Statistical Data Science or the Graduate Diploma of the Royal Statistical Society.

We welcome applicants without traditional entry qualifications as we base decisions on our own assessment of qualifications, knowledge and previous work experience. We may waive formal entry requirements based on judgement of academic potential.

## **Course aims**

The MSc Applied Statistics and Financial Modelling programme aims to provide an advanced and up-to-date course in applied statistics with modules that allow specialisation in stochastic processes and its applications to finance. The core modules are designed to provide a broad education and training in statistics at postgraduate level and provides a stopping off point, in the form of the Postgraduate Certificate in Applied Statistics, for those who do not need more advanced or more specialized training.

Overall, the MSc Applied Statistics and Financial Modelling is designed to meet the changing educational and training needs of adults in employment in a wide variety of applied areas. The courses cover the theory and application of modern statistical and mathematical modelling techniques, and the analytic and computational tools, required to solve applied problems in industry, the public services, scientific research and commerce.

Students should develop a strong theoretical knowledge and understanding of the relevant principles and techniques, as well as the ability to apply these appropriately in practice and to interpret the results in the context of the application. Practical work in the computing sessions enhances the student's practical statistical competence and gives experience in the use of sophisticated, high-level statistical computer packages with advanced programming facilities for modelling and analysis.

The programme aims to develop the student's ability and confidence to learn independently new techniques and new specialized branches of statistics, as well as stochastic processes as applied to the world of finance. A choice of optional and/or compulsory modules is provided to enable students to orient the programme towards their particular interests and career objectives. In addition the project gives experience in carrying out a sustained, independent investigation and giving, both orally and in writing, a well-organized, clear exposition of the problem, the analysis and the conclusions in terms that can be understood by a non-specialist.

## Course structure

Level	Module Code	Module Title	Credit	Comp Core/ Option	Likely teaching term(s)
<b>Full-time – 1 year</b>					
7	EMMS018S7	Probability and Stochastic Modelling	30	Core	T1-2
7	EMMS016S7	Statistical Analysis	30	Core	T1-2
7	EMMS011S7	Financial Modelling and Data Science	30	Comp	T1-2
7		Options from list below (2 x 15 credits)	30	Option(s)	T1, T2
7	EMMS026D7	Project Applied Statistics	60	Core	T3
<b>Part-time – 2 years</b>					
<b>Year 1</b>					
7	EMMS018S7	Probability and Stochastic Modelling	30	Core	T1-2
7	EMMS016S7	Statistical Analysis	30	Core	T1-2
<b>Year 2</b>					
7	EMMS011S7	Financial Modelling and Data Science	30	Comp	T1-2
7		Options from list below (2 x 15 credits)	30	Option(s)	T1, T2
7	EMMS026D7	Project Applied Statistics*	60	Core	Y1 & Y2 T3
*Part-time students start work on the project in Year 1, T3 and complete in Year 2.					
<b>Indicative options</b>					
7	EMMS023H7	Computational Statistics	15	Option	T1
7	BUEM080H7	Bayesian Methods	15	Option	T1
7	EMMS019H7	Linear and Nonlinear Optimization	15	Option	T2
7	EMMS022H7	Statistical Learning	15	Option	T2
7	BUEM111H7	Financial Data Science with Python	15	Option	T1
7	EMMS028H7	Individually Prescribed Reading Course	15	Option	T1 or T2

**Core:** *Module must be taken and passed by student:* Probability and Stochastic Modelling, Statistical Analysis, Project Applied Statistics

**Compulsory:** *Module must be taken but can be considered for compensated credit (see CAS regulations paragraph 24):* Financial Modelling and Data Science

**Option:** *Student can choose to take this module:* Students choose option modules to the value of 30 credits from the list above or from other modules approved by the Programme Director

## How you will learn

Your learning and teaching is organised to help you meet the learning outcomes (below) of the course. As a student, we expect you to be an active learner and to take responsibility for your learning, engaging with all of the material and sessions arranged for you.

Each course is divided into modules. You will find information on the virtual learning site (Moodle, see Academic Support below) about each of your modules, what to expect, the work you need to prepare, links to reading lists, information about how and when you will be assessed. Your learning for this course will be organised around the activities outlined below.

Teaching on this course is a combination of lectures (pre-recorded), seminars and practical computing sessions. Lectures present theory, worked problems and example applications, and

are designed to provide you with an outline or overview of the topic, to engage you with the material and direct you to other resources. They are a springboard for your own learning. Seminars are focused around problem-solving and you will be asked to contribute to discussion around the topic, with material set in advance for which you need to prepare. Workstation sessions allow you to gain practical experience in the analysis and modelling of data. They are therefore self-paced and informal. Detailed course notes, problems and worked solutions are provided to accompany lectures on each module. This facilitates the independent study necessary to fully understand and assimilate the material.

The Project, which is a core module, is a substantial investigation giving you an extended opportunity to combine their theoretical knowledge with practical skills of data analysis, statistical modelling and computing. Correspondingly, the optional Individually Prescribed Reading Course allows you to learn a specialized branch of statistics and present what you have learnt in writing in the form of an extended essay summarizing, evaluating and criticizing the material studied. Individual supervision is provided for both the core Project and optional Individually Prescribed Reading Course.

### **How we will assess you**

The course will use a variety of assessment methods. Assessment is used to enhance your learning rather than simply to test it. For most of the modules associated with this course, your assessment will be through the following types of assessment.

Assignments (formative assessment during the module): typically constituting 20% of the module mark.

Examinations (summative assessment at the end of the module/year): typically constituting 80% of the module mark.

Report and presentation: the Project module is assessed with a written report (80%) and a presentation on the report (20%).

### **Learning outcomes (what you can expect to achieve)**

'Learning outcomes' indicate what you should be able to know or do at the end of your course. Providing them helps you to understand what your teachers will expect and also the learning requirements upon which you will be assessed.

At the end of this course, you should be able to:

- Demonstrate substantial knowledge and understanding of the principles and theory of statistical inference, probability, random variables and their distributions, and random processes
- Demonstrate substantial knowledge and understanding of the principles and theory of experimental and sample survey design and analysis
- Demonstrate substantial knowledge and understanding of how principles and theory are applied to the statistical and stochastic modelling of a wide variety of problems in different application areas, to the design of experimental and observational studies, to the analysis of data from such studies (which may include multivariate and time series data), and to the interpretation of the results
- Demonstrate knowledge and understanding of advanced stochastic modelling techniques along with the ability and experience to apply these in the area of Quantitative Finance

- Abstract the essentials of a practical problem and formulate an appropriate statistical or mathematical model in a way that facilitates analysis of the problem and interpretation of the results
- Demonstrate an understanding of the importance of assumptions, awareness of where they are used and of the possible consequences of their violation
- Demonstrate a deeper knowledge of some specialist areas of statistics and/or operational research and/or computationally intensive statistical methodology, and/or other cognate disciplines
- Carry out independently a sustained investigation requiring an analysis using mathematical, statistical or operational research methods, and to communicate the results clearly, both in writing and orally, in a way that would be understandable to a non-specialist
- Demonstrate substantial knowledge and experience of at least 1 high-level modern statistical package with a programming capability, together with a knowledge of other relevant mathematical and statistical software
- Solve problems using an analytical and systematic approach
- Select or acquire data relevant to a problem and summarise, analyse, present and interpret the data appropriately in the context of the problem
- Demonstrate an ability to understand advanced, abstract material
- Select and use a variety of general, statistical and mathematical software as appropriate, and to incorporate graphical and numerical output into a word processed report
- Communicate and present a statistical report to a designated audience
- Transfer knowledge from one context to another
- Learn independently by study of a range of sources including learned journals
- Work independently and complete a sustained and substantial task
- Develop self-motivation, time management and organization

### **Careers and further study**

You will find Statistics and Finance graduates in the following kinds of roles:

- Actuary
- Data analyst
- Data scientist
- Economist
- Financial advisor
- Financial manager
- Financial risk analyst
- Financial trader
- Investment analyst
- Machine learning engineer
- Operational researcher
- Research scientist
- Statistician

Birkbeck offers a range of careers support to its students. You can find out more on [the careers pages of our website](#).

### **Academic regulations and course management**

Birkbeck's academic regulations are contained in its [Common Award Scheme Regulations](#) and Policies published by year of application on the Birkbeck website.

You will have access to a course handbook on Moodle and this will outline how your course is managed, including who to contact if you have any questions about your module or course.

### **Support for your study**

Your learning at Birkbeck is supported by your teaching team and other resources and people in the College there to help you with your study. Birkbeck uses a virtual learning environment called Moodle and each course has a dedicated Moodle page and there are further Moodle sites for each of your modules. This will include your course handbook.

Birkbeck will introduce you to the Library and IT support, how to access materials online, including using Moodle, and provide you with an orientation which includes an online Moodle module to guide you through all of the support available. You will also be allocated a personal tutor and provided with information about learning support offered within your School and by the College.

Please check our website for more [information about student support services](#). This covers the whole of your time as a student with us including learning support and support for your wellbeing.

### **Quality and standards at Birkbeck**

Birkbeck's courses are subject to our quality assurance procedures. This means that new courses must follow our design principles and meet the requirements of our academic regulations. Each new course or module is subject to a course approval process where the proposal is scrutinised by subject specialists, quality professionals and external representatives to ensure that it will offer an excellent student experience and meet the expectation of regulatory and other professional bodies.

You will be invited to participate in an online survey for each module you take. We take these surveys seriously and they are considered by the course team to develop both modules and the overall courses. Please take the time to complete any surveys you are sent as a student.

We conduct an annual process of reviewing our portfolio of courses which analyses student achievement, equality data and includes an action plan for each department to identify ongoing enhancements to our education, including changes made as a result of student feedback.

Our periodic review process is a regular check (usually every four years) on the courses by department with a specialist team including students.

Each course will have an external examiner associated with it who produces an annual report and any recommendations. Students can read the most recent external examiner reports on the course Moodle pages. Our courses are all subject to Birkbeck Baseline Standards for our Moodle module information. This supports the accessibility of our education including expectations of what information is provided online for students.

The information in this programme specification has been approved by the College's Academic Board and every effort has been made to ensure the accuracy of the information it contains.

Programme specifications are reviewed periodically. If any changes are made to courses, including core and/or compulsory modules, the relevant department is required to provide a revised programme specification. Students will be notified of any changes via Moodle.

Further information about specifications and an archive of programme specifications for the College's courses is [available online](#).

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