Year of entry: 2021/22

Programme Specification

1	**Awarding body**	University of London					
2	**Teaching Institution**	**Birkbeck College**					
3	**Programme Title**	**MSc Mathematics and Financial Modelling**					
4	**Programme Code(s)**	**TMSMATFM_C**					
5	**UCAS code**	N/A					
6	**Home Department**	Economics, Mathematics and Statistics					
7	**Exit Award(s)**	Postgraduate Certificate; Postgraduate Diploma					
8	**Duration of Study** (number of years)	1 year full-time, 2 years part-time					
9	**Mode of Study**	FT	✓	PT	✓	DL	✓
10	**Level of Award (FHEQ)**	7					
11	**Other teaching depts or institution**	N/A					
12	**Professional, Statutory Regulatory Body(PSRB) details**	N/A					
13	**QAA Benchmark Group**	Mathematics, Statistics and Operational Research					

14	**Programme Rationale & Aims**
	The aim of the MSc Mathematics and Financial Modelling is to offer a graduate programme of mathematics with a strong component of financial mathematics and modelling. It will introduce students to key research skills such as literature searches, academic writing and presentation. In line with the College's mission to make high quality education available to students who are not able for whatever reason to study during the day, the programme is delivered by evening, face-to-face study and is offered both in part-time and full-time modes. It is one of the very few taught MSc programmes in this area that can be taken by working students. This programme offers the chance to study a range of modules in pure and applicable mathematics as well as financial mathematics – giving the opportunity to increase knowledge and abilities in these areas. Depending on choices, students will take between six and eight modules, allowing them to study several different topics in depth, and to focus on the areas that interest them most. They will also learn the methods of mathematical research: how to read mathematical papers and how to communicate mathematics, both in written form for their project dissertation, and orally when they give presentations about their project. Students will acquire the skills to pursue their interest in the subject, either formally with a research degree, or informally with independent reading.

15	**Entry Criteria**

	The typical entrance requirement will be at least a second class degree in Mathematics. Depending on their level of knowledge, students without such a degree would be able to take the Graduate Certificate or Graduate Diploma in Mathematics at Birkbeck as a qualifying course. Applicants may be emailed an entrance test to gauge their suitability for the programme.

16	**Learning Outcomes**
	On successful completion of this programme a student will be expected to have: **Subject Specific:** LO1 Knowledge and understanding of, and the ability to use, mathematical techniques. LO2 Knowledge and understanding of a range of results in mathematics and financial modelling. LO3 Familiarity with and ability to work with academic writing of mathematics and/or financial modelling. LO4 A deeper understanding of several topics in mathematics and financial modelling. **Intellectual:** LO5 Ability to comprehend and evaluate conceptual and abstract material LO6 Ability to devise rigorous mathematical proofs. LO7 Ability to understand and apply mathematical reasoning in several different areas of mathematics, including mathematical finance. **Practical:** LO8 Problem-solving skills, including the ability to assess problems logically and to approach them analytically. LO9 Ability to transfer knowledge and expertise from one context to another. LO10 Ability to work in a largely self-directed or autonomous manner. LO11 Communicate conclusions and the knowledge and rationale underpinning these, to specialist and non-specialist audiences, clearly and unambiguously. **Personal and Social:** LO12 Ability to learn independently using a variety of media. LO13 Ability to complete work in a limited time period. LO14 Time-management and organizational skills. LO15 Ability to work professionally with a considerable degree of independence. LO16 Ability to carry out academic work such as collation and synthesis of existing sources on a particular topic LO17 Ability to complete a substantial piece of work at a high academic level.

17	**Learning, teaching and assessment methods**
	The programme comprises 120 credits of taught modules and a 60 credit dissertation. The taught modules will largely be delivered via face-to-face teaching. Lectures present both theory and worked examples. Regular coursework and a variety of assessment methods are also designed to be formative and promote learning. The coursework will consist of short, problem-based assignments. Individual tutorials are provided as required and are an integral part of the teaching provision. Students may also consult staff by telephone and email.

There will be a 60 credit Dissertation. Students will submit a detailed proposal for the project in the first term of their final year of study, and the completed dissertation will be due the following September. Students will complete a written project and give an oral presentation about their work. Guidance on mathematical writing and literature searches, including how to typeset mathematics, will be provided.

Students will be offered a range of 15-credit and 30-credit level 7 modules. As a further option, students may take up to 30 credits of selected level 6 modules from our BSc mathematics programme. This would only be possible for students who had **not** already taken those modules as part of a Birkbeck BSc.

The methods of assessment used are:

- Unseen examinations
- Assessed assignments
- Double marked dissertation
- Oral presentations about the student's dissertation

For taught modules, normally 80% of the assessment comes from unseen examinations in the Summer Term. This allows time for students to assimilate the material and develop a thorough understanding of the course curriculum. The component of assessed coursework enables students to get practice in tackling and solving problems independently, without the time pressure of examinations, and gives staff an opportunity to give relevant feedback.

For the dissertation, 80% of the marks come from the written dissertation, with the remaining 20% from progress reports and oral presentations. The final oral presentation is very important as a gauge of how well the student has really understood the material, rather than merely collating different sources.

The range of assessments, and the type of questions and problems set within examinations and assignments are structured to balance theory and practice, to address the individual learning outcomes and to discriminate between different levels of achievement. However the assessment strategy recognizes that students may exhibit very different aptitudes and abilities in different aspects of the course and in different forms of assessment. This is particularly relevant to Birkbeck students who vary considerably in terms of academic background, prior work experience, current career and future career plans. The assessment strategy is therefore designed to: (i) ensure a good coverage of the curriculum and address the range of learning outcomes, (ii) perform an on-going formative function via the theoretical and practical assignments associated with all course modules; (iii) give all students the opportunity to demonstrate their strengths and show what they can do well.

Both the external and the second internal examiner scrutinize all examination papers before they are finalized. Exams and the Dissertation are all double marked. Coursework is marked by the first examiner and moderated by the second internal examiner. All marks are moderated by the External Examiner, who is invited to comment on the suitability of the assessment methods, criteria and procedures. These comments influence any changes that are recommended at the programme review meeting.

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18	**Programme Description**
	The programme comprises 120 credits of taught modules and a 60 credit dissertation. Students choose from a range of taught option modules, at level 6 and 7. At least 90 of the taught credits must be at level 7, meaning that students can take at most one 30-credit level 6 module during the programme. At least 60 credits of the options should be from the financial options list. The programme director will offer guidance about the most suitable choices, given experience, prior study and future goals. Not all modules run every year; the admissions tutor and programme director will be able to indicate which modules are likely to run during the period of study, although note that individual modules may be cancelled at short notice if there is insufficient demand. Level 6 modules (30 credits) run through the year, in both Autumn and Spring Terms, with two revision lectures and an examination in the Summer Term. Level 7 modules run in either Autumn or Spring Term (or both terms for 30 credit modules), normally with a revision lecture and examination in the Summer Term. Students work on their dissertation throughout their final year of study, with submission in September, andl have a dissertation supervisor to support them through the process. Exit Awards: • *PG Cert Mathematics and Financial Modelling after completion of 60 credits at level 7 INCLUDING* Mathematics of Financial Derivatives (BUEM052H7) AND Derivatives across Asset Classes: Valuation and Hedging (BUEM086H7) • *PG Cert Mathematics after completion of 60 credits at level 7 NOT including both* Mathematics of Financial Derivatives (BUEM052H7) AND Derivatives across Asset Classes: Valuation and Hedging (BUEM086H7) • *PG Dip Mathematics and Financial Modelling after completion of year 1 & 2 taught modules (without the Dissertation)*

19	**Programme Structure**			
Part-Time programme – 2 years				
Year 1				
Level	**Module Code**	**Module Title**	**Credits**	**Status***
7	BUEM119H7	Mathematics Essay	15	Compulsory
Year 2				
Level	**Module Code**	**Module Title**	**Credits**	**Status***
7	BUEM039D7	Mathematics Dissertation	60	Core
Year 1 or 2				
Level	**Module Code**	**Module Title**	**Credits**	**Status***
60 credits of level 7 finance options approved by the programme director				
Indicative list:				
7	EMMS011S7	Mathematical and Numerical Methods	30	Option
7	BUEM052H7	Mathematics of Financial Derivatives	15	Option
7	BUEM086H7	Derivatives across Asset Classes: Valuation and Hedging	15	Option

7	BUEM054H7	Portfolio Theory	15	Option
7	BUEM111H7	Financial Data Science with Python	15	Option
7	BUEM053H7	Market Risk Management	15	Option
7	BUEM051H7	Credit Risk Management	15	Option
At most one of the following level 6 modules:				
6	BUEM010S6	Computational Mathematics	30	Option
6	EMMS093S6	Number Theory and Geometry	30	Option
6	BUEM021S6	Calculus 3: Transforms and Models	30	Option
6	BUEM022S6	Games, Choice and Optimisation	30	Option
Remaining taught modules are from the following indicative list:				
7	BUEM036H7	Group Theory	15	Option
7	BUEM038H7	Mathematics of Communications	15	Option
7	BUEM034H7	Algebraic Number Theory	15	option
7	BUEM035H7	Topics in Graph Theory	15	Option
7	BUEM046H7	Galois Theory	15	Option
7	BUEM061H7	Topology	15	Option
7	BUEM079H7	Combinatorial Optimization	15	Option
7	BUEM098H7	Probabilistic Methods	15	Option
7	EMMS019H7	Linear and Nonlinear Optimization	15	Option
Full time				
Year 1				
Level	**Module Code**	**Module Title**	**Credits**	**Status***
7	BUEM119H7	Mathematics Essay	15	Compulsory
7	BUEM039D7	Mathematics Dissertation	60	Core
60 credits of level 7 finance options approved by the programme director				
Indicative list:				
7	EMMS011S7	Mathematical and Numerical Methods	30	Option
7	BUEM052H7	Mathematics of Financial Derivatives	15	Option
7	BUEM086H7	Derivatives across Asset Classes: Valuation and Hedging	15	Option
7	BUEM054H7	Portfolio Theory	15	Option
7	BUEM111H7	Financial Data Science with Python	15	Option
7	BUEM053H7	Market Risk Management	15	Option
7	BUEM051H7	Credit Risk Management	15	Option
Plus 45 credits of option modules as before; with at most 30 credits at level 6.				

Status*

CORE – Module must be taken and passed by student; COMPULSORY – Module must be taken, mark can be reviewed at sub-exam board; OPTIONAL – Student can choose to take this module

20	**Additional Programme Information**
	Exit Awards: • *PG Cert Mathematics and Financial Modelling after completion of 60 credits at level 7 INCLUDING* Mathematics of Financial Derivatives (BUEM052H7) AND Derivatives across Asset Classes: Valuation and Hedging (BUEM086H7)

	• *PG Cert Mathematics after completion of 60 credits at level 7 NOT including both* Mathematics of Financial Derivatives (BUEM052H7) AND Derivatives across Asset Classes: Valuation and Hedging (BUEM086H7) • *PG Dip Mathematics and Financial Modelling after completion of year 1 & 2 taught modules (without the Dissertation)*

21	**Programme Director**	Prof Maura Paterson
22	**Start Date** ***(term/year)***	Autumn 2016
23	**Date approved by TQEC**	Summer 2016
24	**Date approved by Academic Board**	Summer 2016
25	**Date(s) updated/amended**	May 2020