**PROGRAMME SPECIFICATION**

**KEY FACTS**

| Programme name | Mathematics and Finance<br>Mathematics and Finance with Placement |
|---|---|
| Award | BSc (Hons) |
| School | School of Mathematics, Computer Science and Engineering |
| Department or equivalent | Mathematics |
| UCAS Code | GN13 and GN14 (with placement) |
| Programme code | USMAFN and USMFPA (with placement) |
| Type of study | Full Time |
| Total UK credits | 370 |
| Total ECTS | 185 |

**PROGRAMME SUMMARY**

The principal aim of this programme is to introduce you to a variety of different aspects of modern mathematics, finance and economics, with a particular focus on actuarial science. In mathematics you will focus in particular on applied mathematics, although you will also be introduced to several aspects of pure mathematics throughout the degree. In finance and economics you will focus in particular on those aspects relevant to a career in actuarial science. Thus this degree can be regarded as a hybrid between degrees in Mathematical Science and in Actuarial Science. You will receive training in advanced mathematical techniques and develop problem solving and communication skills much valued by employers.

The first year of the programme is devoted to core material, including basic programming and statistics that is needed by all Mathematics and Finance graduates, together with some basic economics and financial mathematics. On completing Programme Stage one *or* the Certificate in Mathematics and Finance you will be able to discuss underlying concepts and principles of mathematics, programming, economics, finance and statistics and to apply these to specific problems. In the second year the proportion of the course that is core decreases, and you can choose from an increasing range of options. On completing Programme Stage Two *or* the Diploma in Mathematics and Finance you will be able to build on your previous knowledge and experience from Programme Stage One. You will master more advanced mathematical techniques and will be able to apply these to real life problem-solving. In the third year most modules are optional and a wide variety of mathematics, finance, statistics and economics options are available. On completing Programme Stage Three *or* the degree you will further develop a systematic and detailed knowledge and understanding of advanced mathematics and finance. You will have access to modules which draw on current mathematics research and will be exposed to new areas of mathematics with applications to finance, biology and physics.

A distinctive feature of the programme is the final year group project, which provides you with the opportunity to write a technical report and give individual presentations. The summer teaching term in the first two years is also designed around project work and presentation skills.

The programme is undertaken full time, for either three years or four years with an industrial placement during the third year. At the end of the first year it is also possible to transfer to the BSc in Mathematics or Mathematics with Finance and Economics.

Aims

1. To develop in you a comprehensive knowledge of mathematics and a good knowledge of topics in actuarial science.

2. To develop in you the ability to communicate their knowledge and understanding effectively.

3. To prepare you to enter postgraduate studies at the masters level in mathematics, actuarial science, and other closely related subjects.

4. To provide you with the basic knowledge and skills to analyse and solve mathematically based problems.

5. To enable you to cast and solve real-world problems in a mathematical framework.

6. To enable you to appreciate the universal nature of mathematics, a subject with no international boundaries.

**WHAT WILL I BE EXPECTED TO ACHIEVE?**

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

Knowledge and understanding:

- demonstrate a detailed knowledge of the major ideas of pure mathematics.

- demonstrate a comprehensive knowledge of mathematical methods and be able to apply these to a range of associated problems.

- demonstrate a detailed knowledge of the major topics of numerical mathematics, applied and applicable mathematics, computational mathematics, statistics and probability.

- demonstrate a comprehensive knowledge of economic theory, both micro and macro.

- demonstrate an understanding and detailed knowledge of a wide range of financial structures, and of the related statistical processes.

Skills:

- communicate in symbolic and written form and using oral presentations.

- differentiate and integrate a comprehensive range of mathematical functions and carry out basic calculus, applying the same to suitable problems.

- apply core concepts and principles in well-defined contexts, showing judgement in the

selection and application of tools and techniques.

- use your knowledge of computing to construct programmes in order to solve mathematical and non- mathematical problems.

- solve and analyse differential equations using standard analytical and numerical methods.

- comprehend problems, formulating them mathematically and obtaining solutions by appropriate methods.

- acquire an ability to apply mathematics to real world problems, especially in finance.

- understand logical arguments, identifying the assumptions and conclusions made.

- manipulate matrices and vectors and be able to analyse problems involving the same using general methods.

- show confidence in calculating and manipulating mathematics within the context of the core modules in mathematics, statistics and computing.

- apply mathematical methods to a variety of problems.

- demonstrate the basic skills in statistics to be able to understand and formulate a data based problem in statistical terms.

- display a qualitative approach to problems encountered in finance and economics.

- discuss problems in economics using the appropriate language and mode of thinking.
- discuss problems in finance using the appropriate language and mode of thinking.
- apply statistical methods to problems in finance.
- work effectively in a team

Values and attitudes:

- demonstrate the value of logical thought with respect to mathematical problems.

- follow, with rigour, an analytical approach towards problems.

This programme has been developed in accordance with the QAA Subject Benchmark for Mathematics, Statistics, and Operational Research.

---

**HOW WILL I LEARN?**

Teaching and Learning methods are designed to foster your knowledge of and enthusiasm for the subject and stimulate engagement and participation in the learning process. They encourage learning in depth and encourage you to reflect on and take responsibility for your own learning and to develop your academic self-confidence.

The majority of courses are taught using lectures. These are supported through tutorials,

laboratories and examples classes where appropriate.  Details can be found in the individual module specifications.

Lectures are the principal introduction to new material.  They are relatively formal in style and are presented to the whole student group or sometimes to more than one group together.  Each lecture is of 50 minutes duration with the timetable based on units of one hour to allow for short breaks.  Full, prompt attendance is expected.

For tutorials, groups are much smaller and provide opportunities for you to work on problems and exercises connected with the lecture courses.  This also provides an additional opportunity for staff to help you with questions arising from the lectures.

Laboratories provide you with the opportunity to practice computational and programming techniques, and to seek practical help from a tutor.

In addition to the taught elements of the programme, which on average require around 12-15 contact hours per week, there will be the need for private study.  This time will be spent working on background reading, revision of notes, work on tutorial problems, coursework and individual or group work on projects including the major project in Programme Stage 3.

The academic year consists of two eleven week teaching periods, a three week summer teaching period, and two main examination periods.  You are expected to undertake around 30 hours per week of private study spread over a rather longer period than the contact hours, to account for reflective learning weeks, revision and the project work in the summer term.  The ratio of private study to contact hours is approximately 4:1.  The number of self-directed study hours for each module is specified in the module specification.

All modules are supported by an online learning environment called "Moodle".  Moodle contains information specific to the modules you are studying on your programme and additional modules that provide support for your studies in a variety of ways.  Moodle is used by different modules in different ways, but you will generally find module material, such as course schemes, supplementary study material, tutorial sheets etc., which you can download or look at online.  Each module also contains a "Grades" application where you can view your coursework marks.

There are also two Moodle modules which are designed to support your studies in a more general way: the "Mathematics Focal Point" which contains information relevant to the administration of the programme and the "SMCSE Placement & Internships Resource Centre", which helps you find placements and internships.  Moodle will also be used to send messages to you.

All students have Personal Tutors.  These staff members provide small group tutorials throughout Programme Stage 1, and are available to help throughout your time at the University.  They provide support for mathematics and other matters, as well as serving as a link with other resources within the University and possibly elsewhere.

**WHAT TYPES OF ASSESSMENT AND FEEDBACK CAN I EXPECT?**

Assessment and Assessment Criteria

Most modules are assessed with examinations and courseworks. Details can be found in the individual module specifications. Assessment is carried out according to context and purpose and recognises that you may exhibit different aptitudes in different forms of assessment:

- Some assessment is by set exercises or coursework which you take home and complete with the aid of your notes.

- There are formal unseen written examinations every year.

- Some assessment takes the form of class or online tests.

- A small number of modules require students to give presentations.

- A core module at Programme Stage 3 consists of a group project. Group projects also form the basis of assessment for some electives.

In addition to assessing mathematical knowledge and understanding, the programme also assesses the ability to use mathematical ideas in the context of an application, the ability to carry out a substantial piece of independent work and the ability to communicate effectively.

Assessment Criteria are descriptions, based on the intended learning outcomes, of the skills, knowledge or attitudes that you need to demonstrate in order to complete an assessment successfully, providing a mechanism by which the quality of an assessment can be measured. Grade-Related Criteria are descriptions of the level of skills, knowledge or attributes that you need to demonstrate in order to achieve a certain grade or mark in an assessment, providing a mechanism by which the quality of an assessment can be measured and placed within the overall set of marks. Assessment Criteria and Grade-Related Criteria will be made available to you to support you in completing assessments. These may be provided in programme handbooks, module specifications, on the virtual learning environment or attached to a specific assessment task.


Feedback on assessment

Feedback will be provided in line with our Assessment and Feedback Policy. In particular, you will normally be provided with feedback within three weeks of the submission deadline or assessment date. This would normally include a provisional grade or mark. For end of module examinations or an equivalent significant task (e.g. an end of module project), feedback will normally be provided within four weeks. The timescale for feedback on final year projects or dissertations may be longer. The full policy can be found at:


https://www.city.ac.uk/__data/assets/pdf_file/0008/68921/assessment_and_feedback_policy.pdf

Feedback will typically consist either of individual comments on your work, or of model solutions with general comments on common errors delivered during a lecture or via Moodle.  For examinations, you may be allowed to view your scripts for feedback purposes, in conjunction with your lecturer.

Assessment Regulations

In order to pass your Programme, you should complete successfully or be exempted from the relevant modules and assessments and will therefore acquire the required number of credits.  You also need to pass each Programme Stage of your Programme in order to progress to the following Programme Stage.
Your overall aggregate mark will be calculated by combining the aggregate marks from Programme Stages 1, 2 and 3 in the ratio 1:3:6.

The pass mark for each module is 40%. The details of which assessment components need to be passed individually and of their respective pass marks are given in the module specifications.

If you fail an assessment component or a module, the following will apply:

- Compensation: where you fail up to a total of one sixth of the total  credits of Programme Stages 1 or 2 at first or resit attempt, you may be allowed compensation if:

- Compensation is permitted for the module involved (see the What will I Study section of the programme specification), and
- It can be demonstrated that you have satisfied all the Learning Outcomes of the modules in the Programme Stage, and
- A minimum overall mark of no more than 10% below the module pass mark has been achieved in the module to be compensated, and
- An aggregate mark of 40% has been achieved for the Programme Stage.

Where you are eligible for compensation at the first attempt, this will be applied in the first instance rather than offering a resit opportunity.

If you receive a compensated pass in a module you will be awarded the credit for that module. The original component marks will be retained in the record of marks and your original module mark will be used for the purpose of your Award calculation.

- Compensation is not allowed at Programme Stage 3. As an exception to the standard regulations condonation of failure in modules may be considered by the Assessment Board as follows:

- Modules must have been taken in a single valid attempt, including where resits have taken place; this means that you must have taken all assessments associated with the Programme Stage within the normal specified time of that Programme Stage.

- Condonation is only permissible for elective modules as set out in the Programme Scheme, thus ensuring that all Programme Route Learning Outcomes have been met.

- Condonation may only be made in one 15 credit module.

If you receive condonation for a Module you will be awarded the credits for that Module, however the actual mark obtained for that module will be used for the purpose of calculation towards the award.

- Resit: where you are not eligible for compensation at the first attempt, you will be offered one resit attempt.

If you are successful in the resit, you will be awarded the credit for that module. The mark for each assessment component that is subject to a resit will be capped at the pass mark for the module. This capped mark will be used in the calculation of the final module mark together with the original marks for the components that you passed at first attempt.

If you do not meet the pass requirements for a module and do not complete your resit by the date specified you will not progress to the next Programme Stage and the Assessment Board will require you to be withdrawn from the Programme.

If you fail to meet the requirements for a particular Programme Stage or the Programme, the Assessment Board will consider whether you are eligible for an Exit Award as per the table below.
If you would like to know more about the way in which assessment works at City, please see the full version of the Assessment Regulations at:

http://www.city.ac.uk/__data/assets/word_doc/0003/69249/s19.doc

---

**WHAT AWARD CAN I GET?**

Bachelor's Degree with Honours:

| Programme Stage | HE Level | Credits | Weighting (%) | Class | % required |
|---|---|---|---|---|---|
| 1 | 4 | 125 | 10 | I | 70 |
| 2 | 5 | 125 | 30 | II upper division | 60 |
| 3 | 6 | 120 | 60 | II lower division | 50 |
|   |   |   |   | III | 40 |

Ordinary Degree:

| Programme Stage | HE Level | Credits | Weighting (%) | Class | % required |
|---|---|---|---|---|---|
| 1 | 4 | 125 | 10 | With Distinction | 70 |

| 2 | 5 | 125 | 30 | | With Merit | 60 |
| 3 | 6 | 60 | 60 | | Without Classification | 40 |

Diploma of Higher Education:

| Progr amme Stage | HE Level | Credits | Weighting (%) | | Class | % required |
|---|---|---|---|---|---|---|
| 1 | 4 | 125 | 25 | | With Distinction | 70 |
| 2 | 5 | 125 | 75 | | With Merit | 60 |
| | | | | | Without Classification | 40 |

Certificate of Higher Education:

| Progr amme Stage | HE Level | Credits | Weighting (%) | | Class | % required |
|---|---|---|---|---|---|---|
| 1 | 4 | 125 | 100 | | With Distinction | 70 |
| | | | | | With Merit | 60 |
| | | | | | Without Classification | 40 |

**WHAT WILL I STUDY?**

Programme Stage 1

Programme Stage 1 consists of modules that make up 125 credits.  All modules are compulsory.

| Module Title | SITS Code | Module Credits | Core/ Elective | Can be compen- sated? | Level |
|---|---|---|---|---|---|
| Functions, Vectors and Calculus | MA1618 | 30 | C | N | 4 |
| Algebra | MA1605 | 15 | C | N | 4 |
| Introduction to Microeconomics | EC1008 | 15 | C | N | 4 |
| Introduction to Macroeconomics | EC1009 | 15 | C | N | 4 |
| Linear Algebra | MA1622 | 15 | C | N | 4 |
| Introduction to Probability and Statistics | MA1608 | 15 | C | Y | 4 |
| Financial and Investment Mathematics A | MA1614 | 15 | C | N | 4 |
| Skills, Careers and Employability Analysis for Mathematics students | MA1660 | 5 | C | N | 4 |

Programme Stage 2

Programme Stage 2 consists of modules that make up 125 credits.

There are seven compulsory modules and one elective module.

| Module Title | SITS Code | Module Credits | Core/ Elective | Can be compen- sated? | Level |
|---|---|---|---|---|---|
| Programming and Data Science for the Professions | MA2619 | 15 | C | Y | 5 |
| Real and Complex Analysis | MA2616 | 30 | C | N | 5 |
| Vector Calculus | MA2615 | 15 | C | N | 5 |
| Fundamentals of Finance | AS2114 | 15 | C | y | 5 |
| Financial Reporting | AS2207 | 15 | C | Y | 5 |
| Financial and Investment Mathematics B | MA2614 | 15 | C | Y | 5 |
| Professional Development and Employability | MA2700 | 5 | C | N | 5 |
| Sequences and Series | MA2617 | 15 | E | Y | 5 |
| Applied Mathematics | MA2607 | 15 | E | Y | 5 |
| Numerical Mathematics | MA2608 | 15 | E | Y | 5 |
| Applications of Probability and Statistics | MA2611 | 15 | E | Y | 5 |

Programme Stage 3

Programme Stage 3 consists of modules that make up 120 credits. There are three compulsory modules and 60 credits of elective modules. Two modules must come from the mathematics elective modules (which are those in the list of elective modules whose module code begins with MA) and 30 credits from the remainder.

The module MA2611 is a prerequisite for AS2204.

| Module Title | SITS Code | Module Credits | Core/ Elective | Can be compen- sated? | Level |
|---|---|---|---|---|---|
| Differential Equations | MA3660 | 30 | C | N | 6 |
| Group Project | MA3697 | 15 | C | N | 6 |
| Advanced Complex Analysis | MA3661 | 15 | C | N | 6 |
| Game Theory | MA3662 | 15 | E | N | 6 |
| Stochastic Models | AS2204 | 15 | E | N | 5 |
| Operational Research | AS3021 | 15 | E | N | 6 |
| General Insurance | AS3303 | 15 | E | N | 6 |
| Corporate Finance | EC3010 | 15 | E | N | 6 |
| Introduction to Financial | EC3011 | 15 | E | N | 6 |

| Derivatives | | | | | |
|---|---|---|---|---|---|
| Corporate Risk Management | FR2105 | 15 | E | N | 5 |
| Discrete Mathematics | MA3604 | 15 | E | N | 6 |
| Dynamical Systems | MA3608 | 15 | E | N | 6 |
| Introduction to the Mathematics of Fluids | MA3609 | 15 | E | N | 6 |
| Introduction to Mathematical Physics | MA3663 | 15 | E | N | 6 |
| Mathematical Processes for Finance | MA3614 | 15 | E | N | 6 |
| Groups and Symmetry | MA3615 | 15 | E | N | 6 |
| Mathematical Biology | MA3616 | 15 | E | N | 6 |
| Probability 2 | MA3666 | 15 | E | N | 6 |

## WHAT KIND OF CAREER MIGHT I GO ON TO?

Mathematics and finance programmes prepare you for future employment by providing you with key skills highly valued by employers.  Our graduates are very successful at finding employment in a wide range of areas.

Many of our graduates secure jobs in the financial sector.  Some of the typical financial institutions recent graduates have gone on to work for include Lloyds TSB, KPMG, Citigroup, Santander, TBS, Commerzbank, and NatWest.  Typical jobs within the financial sector have included Financial Consultant, Investment Banker, and Customer Service Officer.

Former students have also gone on to do finance-related work such as accounting or banking management for other types of institutions.  Recent examples include the British Museum, The National Children's Bureau, the UK Border Agency and a large number of retailers such as Orange, JD Sports or Sainsbury's.

A significant number of graduates go on to do further study in the form of an MSc or a PhD in a Mathematics related area or to receive specialist training for particular professions.  Examples of specialist training are the PGCE (Postgraduate Certificate in Education), Chartered Financial Analyst and Chartered Accountant.

The Centre for Career & Skills Development provides a service to current full-time and part-time undergraduates and postgraduates and to recent graduates of the University.  Their aim is to give you the advice, information and skills you need to make a smooth transition into the world of work.

If you would like more information on the Careers support available at City, please go to: http://www.city.ac.uk/careers/for-students-and-recent-graduates.

## WHAT PLACEMENT OPPORTUNITIES WILL BE AVAILABLE TO ME?

You may go on an approved placement between the second and third years, taking module MA2698 Professional Placement. Your experience will be graded on the basis of reports from two visits made by the Visiting Tutor and your final report.  However, although the grade obtained is reported on the degree transcript it does not contribute

to the final degree result.

Placement guidelines are issued to students and employers at the commencement of training, and these include a placement health and safety booklet. Early in the placement year you will be required, in conjunction with your Workplace Supervisor and the Visiting Tutor (a member of academic staff), to produce a placement plan. Training is monitored through two formal visits by the Visiting Tutor, and written reports. Informal contact is maintained throughout the year as necessary.

If you wish to take a professional placement then you are advised to register accordingly at the beginning of Programme Stage 2. The School of Mathematics, Computer Science and Engineering Professional Liaison Unit Work Based Learning Advisor collaborates with the University Career and Skills Development Service to deliver a series of Professional Development workshops to prepare you for searching for and applying for a work placement. The Professional Liaison Unit is in regular contact with companies and other organisations concerning the availability of training placements and will advise students on making applications.

Independently from the Placements scheme described above, the Work Based Learning Advisor and the Careers Centre also provide support if you wish to take a summer internship during any of your years at University. Furthermore, City University through the Careers Centre supports several volunteering schemes which allow you to develop valuable work and inter-personal skills.

You are welcome to make your own applications at any time but are strongly advised to discuss these with the Work Based Learning Advisor. Support for seeking placements is provided in the SMCSE Placement & Internships Resource Centre module on Moodle.

---

## HOW DO I ENTER THE PROGRAMME?

Our typical offer for entry to the first year of the programme is AAB with A in A-level mathematics, or an International Baccalaureate with 32 points including 6 at Higher Level mathematics.

Entry is also possible via the International Foundation Programmes provided by INTO City University London and Kaplan International College London. If you have studied another foundation course or have other equivalent qualifications then you will be considered individually.

Please note that TOEFL is not accepted as evidence of English language ability for students that require a Confirmation of Acceptance for Studies. Students taking IELTS are required to obtain an overall grade of at least 6.0 with at least 6.0 in each subcomponent of the test.

**RPL/RP(E)L Requirements**

Second year entry:

Direct entry into the second year is also possible. This is normally for students who have successfully completed the first year of a similar undergraduate course. In all cases you

will be individually assessed by the Admissions Tutor who will determine your suitability for the course.

**Scholarships**

Details of scholarships available to new undergraduate students can be found on the University's website at

http://www.city.ac.uk/study/why-study-at-city/fees-and-finance/scholarships

Version: 7.1
Version date: January 2021
For use from 2021/22