PROGRAMME SPECIFICATION

KEY FACTS

Programme name	Mathematics Mathematics with Placement
Award	MSci (Hons) MSci (Hons) with Placement Year
Exit Awards	BSc (Hons), BSc (Ord), Dipl. of HE, Cert. of HE
School	School of Science & Technology
Department or equivalent	Department of Mathematics
UCAS Code	G103 / G105 with placement
Programme code	USMICS and USMICP (with Placement)
Type of study	Full time
Total UK credits	480 600
Total ECTS	240 300

PROGRAMME SUMMARY

The aim of the MSci Mathematics Degree programme is to introduce you to a variety of different aspects of modern advanced mathematics. You will cover a broad spectrum of mathematical ideas and techniques, with the focus of the later part of the degree being on pure mathematics with relevant applications to real world problems. You will receive training in advanced mathematical methods and develop problem-solving and communication skills much valued by employers.

The programme is organized in four years (also called programme stages) or five years with an industrial placement year. The placement takes place in either the third or the fourth year.

Years 1 and 2 of the programme are designed to build your fundamental mathematical knowledge. They are common with years 1 and 2 of the MSci in Mathematics with Data Science. Years 3 and 4 will cover more advanced topics, whereby you will acquire a deeper expertise of selected parts of the subject.

Year 1 is devoted to core material, essential for all mathematics graduates, including basic programming and statistics. On completing this year, you will be able to discuss underlying

concepts and principles of mathematics, programming and statistics and to apply these to specific problems.

In Year 2, the course consists mainly of core modules, which build on your knowledge and experience accumulated in Year 1 and prepare you for your later studies, but includes also electives for you to choose from. On completing Year 2, you will master more advanced mathematical techniques and will be able to apply these to real-life problem-solving.

In Year 3, most modules are electives and a wide variety of Mathematics electives are available. On completing Year 3, you will further develop a systematic and detailed knowledge and understanding of advanced mathematics and you will be prepared for your final year of study.

In Programme Stage Four, you will focus significantly on pure Mathematics taking core modules together with electives in Mathematics and Data Science, depending upon the choices you made in Stage Three.

A distinctive feature of the programme is the final year project, which provides you with the opportunity to write a technical report and give individual presentations.

The programme is undertaken full time.

Aims

1. To develop in you an in-depth knowledge of mathematics to a high level

2. To develop in you the ability to communicate your knowledge and understanding effectively at a high level.

3. To prepare you to enter postgraduate studies at the master's level in mathematics and other closely related subjects.

4. To provide you with a broad base of knowledge and skills to analyse and solve mathematically based problems showing a level of originality where necessary.

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.

7. To develop in you the ability to work independently with a minimum amount of supervision within a set of agreed guidelines.

WHAT WILL I BE EXPECTED TO ACHIEVE?

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

Knowledge and understanding:

- synthesise and apply the major ideas of Pure Mathematics to an advanced level.

- formulate problems mathematically and select appropriate mathematical methods for a wide range of scenarios.
- evaluate and appropriately apply the major methods of Numerical Mathematics, Applied and Applicable Mathematics, Computing and Computational Mathematics.
- integrate knowledge from various areas and handle complex ideas.

Skills:

- communicate in symbolic and written form and using oral presentations.
- 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.
- comprehend problems, formulating them mathematically and obtaining solutions by appropriate methods.
- acquire an ability to apply mathematics and computational techniques to real world problems.
- understand logical arguments, identifying the assumptions and conclusions made.
- show confidence in calculating and manipulating mathematics within the context of the core modules in mathematics.
- apply mathematical methods to a variety of problems.

Values and attitudes:

- demonstrate the value of logical thought with respect to mathematical problems.
- follow, with rigour, an analytical approach towards problems.
- Work effectively and professionally in a team.

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. The lectures 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 4.

The academic year consists of two teaching periods of eleven weeks 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 platform 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 module specifications, lecture notes, supplementary study material, tutorial sheets, etc., which you can download or look at online. Each module page also contains a “Grades” application where you can view your coursework marks for the module.

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 “SST Placement & Internships Resource Centre”, which helps you find placements and internships. Moodle is also be used to send messages to you.

All students have Personal Tutors. These staff members provide small group tutorials throughout Programme Stage 1 on a weekly basis, hold meetings each term with tutees in stages 2-4, and are available to help throughout your time at the University. They provide support on academic and pastoral matters, as well as serving as a link with other resources within the University.

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 4 consists of an individual project.

In addition to assessing knowledge and understanding of mathematics, the programme also assesses the ability to use these 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 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: 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 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, 3 and 4 in the ratio 1:3:6:6.

For students taking the placement year in year 3 the weightings of years 1-5 will be 6%, 17%, 7%, 35% and 35% respectively. If the placement is taken in year 4, the weightings will then be 6%, 17%, 35%, 7% and 35% respectively.

The pass mark for each module in stages 1-3 is 40% and for stage 4 this is 50%.

Details can be found in the relevant module specifications.

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

1. Compensation: where you fail up to 30 credits or one sixth of the total credits within a Programme Stage, whichever is greater, 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 (50% for Stage 4), and
- The total volume of credits compensated over the entire degree does not exceed 60 credits.

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.

In addition, for the final year of study, condonation of one 15 credit module is possible in lieu of compensation, where the above condition on the minimum overall mark is removed.

Compensation and condonation are only permissible for modules as set out in the Programme Scheme, thus ensuring that all Programme Route Learning Outcomes have been met.

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

If you are successful in the resit, you will be awarded the full 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 St George's, please see the full version of the Assessment Regulations at: Senate-Regulation19-2024_25v3.pdf

WHAT AWARD CAN I GET?

Master of Science with Honours:

Programme Stage	HE Level	Credits	Weighting (%)
1	4	120	6
2	5	120	18
3	6	120	38
4	7	120	38

Class	% required
I	70
II upper division	60
II lower division	50

Master of Science with Honours (with Year 3 placement):

Programme Stage	HE Level	Credits	Weighting (%)
1	4	120	6
2	5	120	17
Placement	6	120	7
3	6	120	35
4	7	120	35

Class	% required
I	70
II upper division	60
II lower division	50

Master of Science with Honours (with Year 4 placement):

Programme Stage	HE Level	Credits	Weighting (%)
1	4	120	6
2	5	120	17
3	6	120	35
Placement	6	120	7
4	7	120	35

Class	% required
I	70
II upper division	60
II lower division	50

Bachelor of Science with Honours:

Programme Stage	HE Level	Credits	Weighting (%)
1	4	120	10
2	5	120	30
3	6	120	60

Class	% required
I	70
II upper division	60
II lower division	50
III	40

Bachelor of Science with Honours (with placement):

Programme Stage	HE Level	Credits	Weighting (%)
1	4	120	9
2	5	120	27
Placement	6	120	10
3	6	120	54

Class	% required
I	70
II upper division	60
II lower division	50
III	40

Ordinary Degree:

Programme Stage	HE Level	Credits	Weighting (%)
1	4	120	10
2	5	120	30
3	6	60	60

Class	% required
With Distinction	70
With Merit	60
Without classification	40

Diploma of Higher Education:

Programme Stage	HE Level	Credits	Weighting (%)
1	4	120	25
2	5	120	75

Class	% required
With Distinction	70
With Merit	60
Without classification	40

Certificate of Higher Education:

Programme Stage	HE Level	Credits	Weighting (%)
1	4	120	100

Class	% required
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 120 credits. All modules are core or compulsory.

Module Title	SITS Code	Module Credits	Core/ Compulsory/Elective	Can be compen-sated?	Level
Functions, Vectors and Calculus I	MA1623	15	Core	N	4
Functions, Vectors and Calculus II	MA1624	15	Core	N	4
Algebra	MA1605	15	Core	N	4
Linear Algebra	MA1622	15	Core	N	4
Introduction to Probability and Statistics	MA1608	15	Compulsory	Y	4
Logic and Set Theory	MA1610	15	Core	N	4

Number Theory and Cryptography	MA1613	15	Core	N	4
Introduction to Modelling	MA1621	15	Compulsory	Y	4

Programme Stage 2

Programme Stage 2 consists of modules that make up 120 credits.

There are seven core or compulsory modules and 15 credits of elective modules

Module Title	**SITS Code**	**Module Credits**	**Core/ Compulsory/Elective**	**Can be compen-sated?**	**Level**
Programming and Data Science for the Professions	MA2619	15	Compulsory	Y	5
Real Analysis	MA2618	15	Core	N	5
Vector Calculus	MA2615	15	Core	N	5
Sequences and Series	MA2617	15	Compulsory	Y	5
Decision Analysis	AS2021	15	Elective	Y	5
Applied Mathematics	MA2607	15	Compulsory	Y	5
Numerical Mathematics	MA2608	15	Compulsory	Y	5
Professional Development and Employability for Mathematics	MA2201	15	Core	N	5
Applications of Probability and Statistics	MA2611	15	Elective	Y	5

Programme Stage 3

Programme Stage 3 consists of modules that make up 120 credits. There are two core modules, a core Group Project and 75 credits of elective modules.

Note on *super-modules*:
- For *super-modules*, i.e. modules with identical titles (but differing module codes) offered at both Level 6 and Level 7, only one of these modules may be chosen.
- In these module pairs, the differences are primarily within the learning outcomes (Knowledge and Understanding and Skills) and how they are assessed. The learning activities and assessment will be aligned accordingly to reflect these differences.

Students MUST take Game Theory and Graph Theory at either level 6 or 7.

You may transfer between the MSci in Mathematics with Data Science, the MSci in Mathematics, the BSc in Mathematics with Data Science and the BSc in Mathematics at any time up until the start of year 3. Transfers are not automatic, but subject to the approval of the Programme Director, who will take academic performance into consideration.

Module Title	SITS Code	Module Credits	Core/Compulsory/ Elective	Can be compen-sated?	Level
Differential Equations I	MA3617	15	Core	N	6
Differential Equations II	MA3618	15	Elective	N	6
Complex Analysis	MA3659	15	Core	N	6
Codes	MA3100	15	Elective	Y	6
Group Project	MA3697	15	Core	N	6
Advanced Complex Analysis	MA3661	15	Elective	Y	6
Operational Research	AS3021	15	Elective	Y	6
Probability 2	MA3666	15	Elective	Y	6
Graph Theory	MA3300	15	Elective	Y	6
Game Theory	MA3662	15	Elective	Y	6
Dynamical Systems	MA3608	15	Elective	Y	6
Introduction to the Mathematics of Fluids	MA3609	15	Elective	Y	6
Introduction to Mathematical Physics	MA3663	15	Elective	Y	6
Mathematical Processes for Finance	MA3614	15	Elective	Y	6
Groups and Symmetry	MA3615	15	Elective	Y	6
Mathematical Biology	MA3616	15	Elective	Y	6
Accenture School of Tech: Building skills in Tech Transformation, Cloud and Consultancy	IN2032	15	Elective	Y	5

With Placement route:

Module Title	SITS Code	Module Credits	Core/ Elective	Can be compen-sated?	Level
Professional Placement & Career Development module.	IN3053	120	Core	N	6

Programme Stage 4

For an MSci (Honours) degree student to progress from Programme Stage 3 to Programme Stage 4, Programme Stage 3 requirements must have been satisfied, and in addition an overall aggregate of 50% achieved at Programme Stage 3.

This Programme Stage consists of six elective modules worth 15 credits, and a core project worth 30 credits.

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Students can take at MOST two of Machine Learning, Data Visualisation, Neural Computing, Principles of Data Science and Principles of Artificial Intelligence.

Module Title	SITS Code	Module Credits	Core/Compulsory/ Elective	Can be compensated?	Level
MSci Project	MAM409	30	Core	N	7
The Mathematics of Information	MAM401	15	Elective	Y	7
Forecasting	MAM402	15	Elective	Y	7
Perturbation Methods	MAM403	15	Elective	Y	7
Mathematics for Quantum Computing	MAM404	15	Elective	Y	7
Game Theory	MAM405	15	Elective	Y	7
Graph Theory	MAM406	15	Elective	Y	7
Mathematics: algorithms, computation and experimentation	MAM407	15	Elective	Y	7
Dynamical Systems	MAM408	15	Elective	Y	7
Principles of Artificial Intelligence	INM466	15	Elective	Y	7
Data Visualisation	INM402	15	Elective	Y	7
Neural Computing	INM427	15	Elective	Y	7
Principles of Data Science	INM430	15	Elective	Y	7
Machine Learning	INM431	15	Elective	Y	7

TO WHAT KIND OF CAREER MIGHT I GO ON?

Mathematics 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 St George's, please go to: https://www.citystgeorges.ac.uk/prospective-students/career-development/pathways

WHAT PLACEMENT OPPORTUNITIES ARE AVAILABLE?

You will have the opportunity to undertake a one-year placement before the final year of your programme. You will be given the opportunity to secure a role in a diverse range of companies from multinational organisations to small and medium sized (SMEs) including dynamic startup ventures both in the UK and internationally. The broad spectrum of roles available will enable you to focus on your interests whilst being exposed to new experiences and challenges.

Your placement should be approved by the Corporate Relations & Employability Unit (CREU).

You will need to source and apply for any placement opportunities independently however support and guidance will be provided throughout the application process by the CREU.

The placement year will be worth 120 credits and weighted at 7% of your final degree grade. Your placement grade will be based on the grades achieved on successful completion of IN3053 Professional Placement & Career Development module.

WILL I GET ANY PROFESSIONAL RECOGNITION?

This programme is accredited to meet the educational requirements of the Chartered Mathematician designation awarded by the Institute of Mathematics and its Applications. https://ima.org.uk/university-degree-programme-accreditation/

HOW DO I ENTER THE PROGRAMME?

Our standard offer for the Mathematics MSci is 128 UCAS tariff points, for example ABB in three A levels, with at least a B in A-level Mathematics.

The minimum GCSE English Language is 4 and the minimum GCSE Mathematics is 5.

Suitable equivalent overseas qualifications are also considered. However, in all cases the final decision is subject to the satisfactory evaluation of prior qualifications by the Admissions Tutor.

English language requirements: IELTS: 6.0 with a minimum of 6.0 in the writing sub-test GCSE: English language grade C. Please note that TOEFL is not accepted as evidence of English language ability for students that require a Confirmation of Acceptance for Studies.

Each application is treated on its own merit. This is to allow us to weight in work experience, personal statements, and other factors, as and when appropriate.

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.

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