

## Programme Specification: Undergraduate

### For students starting in Academic Year 2017/2018

#### 1. Course Summary

<b>Names of programme(s) and award title(s)</b>	Master in Mathematics (MMath) Master in Mathematics with International Year (see Annex A for details) Master in Mathematics with Work Placement Year (see Annex B for details)
<b>Award type</b>	Integrated Masters
<b>Mode of study</b>	Full time
<b>Framework of Higher Education Qualification (FHEQ) level of final award</b>	Level 7
<b>Duration</b>	4 years 5 years with International Year or Placement Year
<b>Location of study</b>	Keele University – main campus
<b>Accreditation (if applicable)</b>	The three programmes are accredited by the Institute of Mathematics and its Applications (IMA).
<b>Regulator</b>	Office for Students (OfS)
<b>Tuition Fees</b>	<p><b>UK/EU students:</b> Fee for 2017/18 is £9,250*</p> <p><b>International students:</b> Fee for 2017/18 is £13,000**</p> <p>The fee for the international year abroad is calculated at 15% of the standard year fee</p> <p>The fee for the work placement year is calculated at 20% of the standard year fee</p>
<b>Additional Costs</b>	Refer to section 18

**How this information might change:** Please read the important information at <http://www.keele.ac.uk/student-agreement/>. This explains how and why we may need to make changes to the information provided in this document and to help you understand how we will communicate with you if this happens.

\* These fees are regulated by Government. We reserve the right to increase fees in subsequent years of study in response to changes in government policy and/or changes to the law. If permitted by such change in policy or law, we may increase your fees by an inflationary amount or such other measure as required by government policy or the law. Please refer to the accompanying Student Terms & Conditions. Further information on fees can be found at <http://www.keele.ac.uk/studentfunding/tuitionfees/>

\*\* We reserve the right to increase fees in subsequent years of study by an inflationary amount. Please refer to the accompanying Student Terms & Conditions for full details. Further information on fees can be found at <http://www.keele.ac.uk/studentfunding/tuitionfees/>

## **2. What is an Integrated Masters programme?**

Keele University has a long tradition of offering a broad undergraduate curriculum based on a Dual Honours system which allows students to study two subjects to Honours level. More recently, the University has recognised that some students may wish to concentrate on one of their subjects, particularly at advanced levels, by opting to take that subject as a 'Major'. The University also offers Single Honours programmes that allow students to focus more or less exclusively on their main subject.

In keeping with Keele's commitment to breadth in the curriculum, the programme also gives students the opportunity to take some modules outside Mathematics, in other disciplines and in modern foreign languages as part of a 480-credit Honours degree. Thus it enables students to gain, and be able to demonstrate, a distinctive range of graduate attributes.

Integrated master's awards - which are common in science, mathematics and engineering - are delivered through a programme that combines study at the level of a bachelor's degree with honours with study at Master's level. As such, a student graduates with a master's degree after a single four-year programme of study. The Integrated Masters programme described in this document builds upon the three year Single Honours programme by adding a fourth year in which students study modules in Mathematics at an advanced level.

## **3. Overview of the Programme**

Mathematics is a traditional discipline with a very long history. The programme provides a broad coverage of the main discipline areas, including pure mathematics, applied mathematics and statistics. The MMath programme has been designed with a view to further enhancing transferable and employability skills. The programme gives maximum flexibility by way of a substantial number of optional modules in the final two years, thus allowing students to specialise in a given area or to follow a wide curriculum. Building on the three-year BSc Single Honours programme, the MMath will provide students with the opportunity to proceed to a higher level of study. The MMath programme will help students to develop key research skills in the final year. In particular, final year MMath students will undertake a substantial project under the supervision of a member of staff and will prepare and deliver poster and seminar presentations. This is a programme for students with an interest in the subject, both for its own sake and for its application to real-world problems.

## **4. Aims of the Programme**

The broad aims of the programme are to:

- provide you with mathematical knowledge and understanding, including logical argument, rigorous proof, problem-solving, data handling and analysis, and mathematical modelling;
- further develop your interest in mathematics and to cultivate their appreciation of its beauty and elegance within a caring and intellectually stimulating environment;
- produce skilled and motivated graduates who are suitably prepared for postgraduate study or employment within or outside their field;
- equip you with a range of generic and employability skills, particularly in areas where precise, logical thought and problem-solving skills are valued, and to provide a foundation for life-long study and enquiry in mathematics.
- To provide a foundation for life-long learning, study and enquiry in mathematics.

Further, and in accordance with the Quality Assurance Agency (QAA) 2009 Mathematics, Statistics and Operational Research (MSOR) benchmark statement for MMath programmes, a graduate who completes this Programme should, in addition to reaching the level for a bachelor's degree, be able to:

- demonstrate understanding of the main body of knowledge of the Programme, providing a basis for originality in developing and/or applying ideas, sometimes within a research context, and should extend and enhance the understanding associated with achievement at bachelor's level;

- apply knowledge and problem-solving abilities in new or unfamiliar environments;
- integrate knowledge and handle complexity, and formulate judgements with incomplete or limited information, where appropriate reflecting on social or ethical responsibilities linked to the application of that knowledge or those judgements;
- communicate conclusions and the knowledge and rationale underpinning these, to specialist and non-specialist audiences, clearly and unambiguously;
- demonstrate the ability to work professionally with a considerable degree of independence;
- continue to study in a manner that may be largely self-directed or autonomous.

## 5. What you will learn

The intended learning outcomes of the programme (what students should know, understand and be able to do at the end of the programme), can be described under the following headings:

- Subject knowledge and understanding
- Subject specific skills
- General skills

### Subject knowledge and understanding

Successful students will be able to demonstrate knowledge and understanding of:

- U1 appropriate mathematical methods and techniques in the areas of calculus, algebra, differential equations, vector calculus, complex variable, abstract algebra, and probability
- U2 the use of mathematical notation
- U3 the role of precise and logical argument and deductive reasoning, including the formal process of mathematical proof
- U4 the use of structured mathematical and analytical approaches to problem solving
- U5 the science of data investigation and visualisation, and the application of statistics
- U6 probability-based models, hypothesis testing, statistical inference and likelihood
- U7 the power of generalisation and abstraction
- U8 the application of mathematical modelling techniques to the solution of real-world problems
- U9 symbolic manipulation packages and mathematical word-processing tools

In addition to the above, a graduate who has reached the typical level for MMath should further be able to:

- M1 demonstrate understanding of the main body of knowledge of the programme, which should extend and enhance the understanding associated with achievement at the Bachelor's level;
- M2 apply knowledge and problem-solving abilities in new or unfamiliar environments and within broader contexts;
- M3 integrate knowledge and handle complexity, and formulate judgements with incomplete or limited information;
- M4 communicate conclusions and the knowledge and rationale underpinning these, to specialist and non-specialist audiences, clearly and unambiguously;
- M5 demonstrate the ability to work professionally and with a considerable degree of independence, and continue to study in a self-directed and autonomous manner.

### Subject specific skills

Successful students will be able to:

- S1 demonstrate knowledge of key mathematical and statistical concepts, both explicitly and by applying them to the solution of mathematical problems

- S2 comprehend problems, abstract their essential components and formulate them in symbolic terms so as to facilitate their analysis and solution, understanding how mathematical and/or statistical processes may be applied to them
- S3 select and apply appropriate mathematical and/or statistical techniques
- S4 use mathematical models to analyse a problem and to interpret the results of the analysis
- S5 understand the importance of assumptions made in mathematical and statistical models, be aware of when and where they are used and the possible consequences of their violation
- S6 construct and develop logical mathematical arguments with clear identification of assumptions and conclusions
- S7 reason critically, carefully and logically and derive (prove) mathematical results
- S8 demonstrate facility with mathematical abstraction
- S9 demonstrate skills designing observational studies, analysing data resulting from them, and formulating and testing hypotheses
- S10 use symbolic mathematical software packages, statistical packages and mathematical typesetting software
- S11 research and write up a topic in the style of an academic journal article

## General skills

Successful students will be able to:

- G1 analyse and solve problems, thinking carefully and logically and making reasoned decisions
- G2 persist with the solution to a problem until its successful conclusion
- G3 make critical interpretations of data and text, and develop reasoned arguments
- G4 take responsibility for their own learning and reflect upon that learning
- G5 develop and sustain effective approaches to learning, including time-management, organisation, flexibility, creativity and intellectual integrity
- G6 acquire, analyse, synthesise, summarise and present information and ideas from a range of sources and to communicate this effectively and coherently by written and spoken means
- G7 be adaptable, in particular to display a readiness to address new problems in new areas
- G8 work independently or with others to achieve an objective
- G9 motivate themselves and sustain that motivation over an extended period of time

## Keele Graduate attributes

Engagement with this programme will enable you to develop your intellectual, personal and professional capabilities. At Keele, we call these our ten Graduate Attributes and they include independent thinking, synthesizing information, creative problem solving, communicating clearly, and appreciating the social, environmental and global implications of your studies and activities. Our educational programme and learning environment is designed to help you to become a well-rounded graduate who is capable of making a positive and valued contribution in a complex and rapidly changing world, whichever spheres of life you engage in after your studies are completed.

Further information about the Keele Graduate Attributes can be found here: <http://www.keele.ac.uk/journey/>

## 6. How is the Programme taught?

Learning and teaching methods used on the Programme vary according to the subject matter and the level of the module. They include the following:

- **traditional lectures** providing students with detailed notes, very often supported by pre-prepared gapped notes, in electronic and/or printed form
- **examples classes** are more informal than lectures and provide the class tutor with an opportunity to work more closely with students to revise and enforce core theoretical ideas from the lectures in the context of extra examples

- **practical sessions** in computer laboratories, using PCs interactively and becoming familiar with different types of mathematical software
- **web-based learning** using the University's virtual learning environment (KLE)
- **directed reading** on specific topics under the supervision of a member of academic staff
- **group project sessions** in which students work together to produce videos, posters and other printed materials
- For those students who take the **project module** in their final year, the opportunity to undertake a piece of independent study supervised and supported by a member of staff

These learning and teaching methods enable students to achieve the stated outcomes of the programme in a variety of ways. For example:

- lectures and examples classes allow students to gain a systematic knowledge and understanding of mathematical concepts and ideas and how to apply them to real-life problem solving
- web-based learning and directed reading allow students to develop their interest in mathematics, their ability to reflect on their own learning and to take responsibility for its development
- group sessions enable students to develop their written and oral communication skills
- practical sessions and group work encourage students to work both independently and in collaboration with others as well as enabling them to solve problems in new or unfamiliar environments

Apart from these formal activities, students are also provided with regular opportunities to talk through particular areas of difficulty, and any special learning needs they may have, with their Personal Tutors or module lecturers on a one-to-one basis.

## 7. Teaching Staff

Currently our core teaching staff comprises of Professors, Senior Lecturers, Lecturers and Teaching Fellows.

The University will attempt to minimise changes to our core teaching teams, however, delivery of the programme depends on having a sufficient number of staff with the relevant expertise to ensure that the programme is taught to the appropriate academic standard.

Staff turnover, for example where key members of staff leave, fall ill or go on research leave, may result in changes to the programme's content. The University will endeavour to ensure that any impact on students is limited if such changes occur.

## 8. What is the Structure of the Programme?

The academic year runs from September to June and is divided into two semesters. The number of weeks of teaching will vary from course to course, but you can generally expect to attend scheduled teaching sessions between the end of September and mid-December, and from mid-January to the end of April.

Our degree courses are organised into modules. Each module is usually a self-contained unit of study and each is usually assessed separately with the award of credits on the basis of 1 credit = 10 hours of student effort. An outline of the structure of the programme is provided in the tables below.

There are four types of module delivered as part of this programme. They are:

- Compulsory core module – a module that you are required to study on this course;
- Optional core module – these allow you some limited choice of what to study from a list of modules;
- Programme approved elective module – subject-related modules that count towards the number of subject credits required by your degree;
- Free-standing elective module – a free choice of modules that count towards the overall credit requirement but not the number of subject-related credits.

## Year 1 (Level 4)

Compulsory Core modules	Credits	Optional Core / Programme Approved Elective modules	Credits
Algebra	30	Applicable Mathematics	15
Calculus	30		
Investigations and Problem Solving	15	<b>Elective Modules:</b> in the second semester students may take two free-standing electives or Applicable Mathematics along with one free-standing elective. For the list of free-standing elective modules offered by all schools see <a href="http://www.keele.ac.uk/electives/">http://www.keele.ac.uk/electives/</a>	
Mathematical Methods	15		

For the elective module in the first year, students may choose to study a module which is offered by other disciplines in the University in place of a module offered by Mathematics. Such modules include:

- Modern foreign languages modules at different levels in French, German, Spanish, Italian, Russian and Japanese.
- Freestanding modules in subjects of general interest, including ethics, contemporary religions, and the politics, society and culture of some of Britain's European neighbours.
- Freestanding modules related to student volunteering.
- Modules designed to help students for whom it is not their first language to improve their use of English for academic purposes.

## Year 2 (Level 5)

Compulsory Core modules	Credits	Optional Core / Programme Approved Elective modules	Credits
Differential Equations	15	Dynamics	15
Probability	15	Analysis II	15
Analysis I	15	Introduction to Mathematics Education	15
Computational Mathematics	15		
Complex Variable I and Vector Calculus	15		
Mathematical Modelling	15		
Abstract Algebra	15	<b>Optional Modules:</b> in semester two students take three compulsory modules together with one optional module from a choice of three.	

Students choosing the international year take the 120 credit compulsory module 'MAT-20030 International Study Module'. This is a Level 5 module.

Students choosing the placement year take the non-credit bearing compulsory module 'MAT-30035 Work Placement Year'. This is a Level 6 module.

## Year 3 (Level 6)

Optional Core modules	Credits	Optional Core modules	Credits
Nonlinear Differential Equations	15	Waves	15
Partial Differential Equations	15	Medical Statistics	15
Group Theory	15	Mathematical Biology	15
Number Theory and Cryptography	15	Introduction to Mathematics Teaching	15
Professional Mathematics	15	Project	15
Financial Mathematics	15	Complex Variable II	15
Graph Theory	15	Project (30 credits)	30
Fluid Mechanics	15		

Linear Algebra	15		
<b>Optional Modules:</b> students choose four modules 15-credit modules in each semester. The choice will depend on any timetabling restrictions and will be subject to the student having met the necessary prerequisites. Some modules may not be available every year.			

### Year 4 (Level 7)

Compulsory Core modules	Credits	Optional modules	Credits
Masters Project	60	Field and Galois Theory	20
		Combinatorial Designs	20
		Continuum Mechanics	20
		Hydrodynamic Stability Theory	20
		Linear Elasticity	20
		Topics in Group Theory	20
		Perturbation Methods	20
		Numerical Modelling with Partial Differential Equations	20
<b>Optional Modules:</b> students take three optional modules alongside the compulsory Research Project module. The choice will depend on availability and timetabling restrictions.			

For further information on the content of modules currently offered please visit:

[www.keele.ac.uk/recordsandexams/az](http://www.keele.ac.uk/recordsandexams/az)

### Learning Outcomes

The tables below set out what students learn in the programme, the modules in which that learning takes place, and the main ways in which students are assessed on their learning. In the first two years these learning outcomes are achieved mainly in the compulsory core modules which all students are required to take. Some of the outcomes are also achieved in the optional core modules. In the third year the stated outcomes are achieved by the student taking a selection of eight optional core modules. In the fourth year the stated outcomes are achieved through a combination of the compulsory Research project module and three optional modules. Note that all core material is studied in the first two years with students having the option to specialise, or retain a broad-based curriculum, in their third and fourth years.

Mathematics is a highly hierarchical discipline in which understanding at one level is very much dependent upon a thorough knowledge and understanding of the material in previous levels. This is reflected in the fact that a large number of third and fourth year optional modules have strict prerequisites.

In the table below, references to modules in bold are to compulsory modules.

Subject Knowledge and Understanding		
Learning Outcome	Module in which this is delivered	Principal forms of assessment (of the Level Outcome) used
<i>Successful students will be able to demonstrate knowledge &amp; understanding of:</i>		
U1 – appropriate mathematical methods and techniques in the areas of calculus, algebra, differential equations, vector calculus, complex variable, abstract algebra, and probability.	All Level 4 and Level 5 compulsory modules together with a selection of optional modules at all levels.	Coursework, assignment, class test, and unseen examination.

U2 – the use of mathematical notation.	All modules	All assessments.
U3 – the role of precise and logical argument and deductive reasoning, including the formal process of mathematical proof.	Algebra, Complex Variable and Vector Calculus, Abstract Algebra, Probability, Level 6 and Level 7 optional modules.	Coursework, assignment, class test, and unseen examination.
U4 – the use of structured mathematical and analytical approaches to problem solving.	All modules but, in particular, Investigations and Problem Solving, Applicable Mathematics, Mathematical Modelling, Professional Mathematics.	All assessments.
U5 – the science of data investigation and visualisation, and the application of statistics.	Probability, Medical Statistics, Financial Mathematics  Level 6 and Level 7 Project.	Coursework, class test, short report, unseen examination.  Project presentation, poster and report.
U6 – probability-based models, hypothesis testing, statistical inference and likelihood.	Probability, Medical Statistics, Financial Mathematics  Level 6 and Level 7 Project.	Coursework, class test, unseen examination.  Project presentation, poster and report.
U7 – the power of generalisation and abstraction.	Abstract Algebra, Group Theory, Number Theory and Cryptography, Graph Theory, Metric Spaces and Topology, Linear Algebra, Field and Galois Theory.  Level 6 and Level 7 Project.	Coursework, class tests, and unseen examination.  Project presentation, poster and report.
U8 – the application of mathematical modelling techniques to the solution of real-world problems.	Investigations and Problem Solving, Applicable Mathematics, Mathematical Modelling, Dynamics, Stochastic Processes, Level 6 and Level 7 optional, applied mathematics modules.  Level 6 and Level 7 Project.	Coursework, class test, short report, video, unseen examination.  Project presentation, poster and report.
U9 – symbolic manipulation packages and mathematical word-processing tools (including <i>Mathematica</i> and <i>LaTeX</i> ).	Investigations and Problem Solving, Applicable Mathematics, Differential Equations, Mathematical Modelling, , Computational Mathematics, Medical Statistics, Professional Mathematics.  Level 6 and Level 7 Project.	Coursework, class test, short report, unseen examination.  Project presentation, poster and report.
B1 – demonstrate understanding of the main body of knowledge of the programme, which should extend and enhance the understanding associated with achievement at Bachelor’s level.	All Level 7 modules	All assessments

B2 – apply knowledge and problem-solving abilities in new or unfamiliar environments and within broader contexts.	All Level 7 modules	All assessments
B3 – integrate knowledge and handle complexity, and formulate judgements with incomplete or limited information.	All Level 7 modules	All assessments
B4 – communicate conclusions and the knowledge and rationale underpinning these, to specialist and non-specialist audiences, clearly and unambiguously.	Level 7 Masters Project	Poster, seminar presentation and written report
B5 – demonstrate the ability to work professionally and with a considerable degree of independence, and continue to study in a self-directed and autonomous manner.	All Level 7 modules	All assessments

<b>Subject Specific Skills</b>		
<b>Learning Outcome</b>	<b>Module in which this is delivered</b>	<b>Principal forms of assessment (of the Level Outcome) used</b>
<i>Successful students will be able to:</i>		
S1 – demonstrate knowledge of key mathematical and statistical concepts, both explicitly and by applying them to the solution of mathematical problems.	All modules	All assessments
S2 – comprehend problems, abstract their essential components and formulate them in symbolic terms so as to facilitate their analysis and solution, understanding how mathematical and/or statistical processes may be applied to them.	Investigations and Problem Solving, Applicable Mathematics, Differential Equations, Dynamics, Mathematical Modelling, Number Theory and Cryptography, Level 6 and Level 7 applied mathematics modules.  Level 6 and Level 7 Project.	Coursework, class test, short report, video, unseen examination.  Project presentation, poster and report.
S3 – select and apply appropriate mathematical and/or statistical techniques.	All modules	All assessments
S4 – use mathematical models to analyse a problem and to interpret the results of the analysis.	Investigations and Problem Solving, Applicable Mathematics, Differential Equations, Dynamics, Mathematical Modelling, Number Theory and Cryptography, Level 6 and Level 7 applied mathematics modules.	Coursework, class test, short report, video, unseen examination.

	Level 6 and Level 7 Project	Project presentation, poster and report
S5 – understand the importance of assumptions made in mathematical and statistical models, be aware of when and where they are used and the possible consequences of their violation.	Investigations and Problem Solving, Applicable Mathematics, Differential Equations, Dynamics, Mathematical Modelling, Number Theory and Cryptography, Level 6 and Level 7 applied mathematics modules.  Level 6 and Level 7 Project.	Coursework, class test, short report, video, unseen examination.  Project presentation, poster and report
S6 – construct and develop logical mathematical arguments with clear identification of assumptions and conclusions.	All modules	All assessments
S7 – reason critically, carefully and logically and derive (prove) mathematical results.	Calculus, Algebra, Abstract Algebra, Analysis I, Probability, Analysis II, Complex Variable and Vector Calculus, Level 6 and Level 7 pure mathematics modules.  Level 6 and Level 7 Project.	Coursework, class tests, and unseen examination.  Project presentation, poster and report
S8 – demonstrate facility with mathematical abstraction.	Abstract Algebra, Graph Theory, Group Theory, Number Theory and Cryptography, Metric Spaces and Topology, Linear Algebra, Field and Galois Theory.	Coursework, class test, unseen examination.
S9 – demonstrate skills designing observational studies, analysing data resulting from them, and formulating and testing hypotheses.	Investigations and Problem Solving, Applicable Mathematics, Mathematical Modelling, Medical Statistics, Financial Mathematics,  Professional Mathematics, Level 6 and Level 7 applied mathematics modules.  Level 6 and Level 7 Project.	Coursework, class test, short report, video, unseen examination.  Project presentation, poster and report
S10 – use symbolic mathematical software packages, statistical packages and mathematical typesetting software.	Investigations and Problem Solving, Applicable Mathematics, Differential Equations, Mathematical Modelling, Computational Mathematics, Medical Statistics, Professional Mathematics.  Level 6 and Level 7 Project	Coursework, class test, short report, video, unseen examination.  Project presentation, poster and report
S11 - research and write up a topic in the style of an academic journal article.	Level 7 Project	Project report

<b>General Skills</b>		
<b>Learning Outcome</b>	<b>Module in which this is delivered</b>	<b>Principal forms of assessment (of the Level Outcome) used</b>
<i>Successful students will have the opportunity to develop:</i>		
G1 – analyse and solve problems, thinking carefully and logically and making reasoned decisions.	All modules	All assessments
G2 – persist with the solution to a problem until its successful conclusion.	All modules	All assessments
G3 – make critical interpretations of data and text, and develop reasoned arguments.	All modules, but in particular Applicable Mathematics, Mathematical Modelling, Level 5 and Level 6 applied and statistical modules.  Level 6 and Level 7 Projects	All assessments
G4 – take responsibility for own learning and reflect upon that learning.	All modules but, in particular, Investigations and Problem Solving, Applicable Mathematics, Mathematical Modelling, Professional Mathematics.  Level 6 and Level 7 Projects	All assessments
G5 – develop and sustain effective approaches to learning, including time-management, organisation, flexibility, creativity and intellectual integrity.	All modules	All assessments
G6 – acquire, analyse, synthesise, summarise and present information and ideas from a range of sources and to communicate this effectively and coherently by written and spoken means.	All modules, but in particular Level 6 and Level 7 Projects	All assessments
G7 – be able, in particular, to display a readiness to address new problems in new areas.	Level 6 and Level 7 modules, but in particular the Level 6 and Level 7 Projects	Coursework, class tests, and unseen examination  Project presentation, poster and report
G8 – work independently or with others to achieve an objective.	All modules	All assessments
G9 – motivate themselves and maintain that motivation over an extended period of time.	All modules, in particular the Level 6 and Level 7 Projects	All assessments, but in Particular the Project presentation, poster and report

## 9. Final and intermediate awards

Credits required for each level of academic award are as follows:

<b>Master in Mathematics Degree</b>	480 credits	You will require at least 120 credits at levels 4, 5, 6 and 7  You must accumulate at least 450 credits in Mathematics (out of 480 credits overall), with at least 90 credits in Year 1 (Level 4) and 120 credits in each of Years 2, 3 and 4 (Levels 5, 6 and 7) in Mathematics modules.  NB: students transferring to the MMath programme from the Mathematics dual honours programme will require only 360 credits in Mathematics modules, with 120 credits coming from Level 6 modules and 120 credits from Level 7 modules.
<b>Honours Degree</b>	360 credits	You will require at least 120 credits at levels 4, 5 and 6
<b>Diploma in Higher Education</b>	240 credits	You will require at least 120 credits at level 4 or higher and at least 120 credits at level 5 or higher
<b>Certificate in Higher Education</b>	120 credits	You will require at least 120 credits at level 4 or higher

**Master in Mathematics with International Year:** in addition to the above students must pass a module covering the international year in order to graduate with a named degree in Mathematics with International Year. Students who do not complete, or fail the international year, will be transferred to the four-year Mathematics programme.

**Mathematics with Work Placement Year:** in addition to the above students must pass MAT-30035, the non-credit bearing module covering the work placement year, in order to graduate with the 'with work placement year' version of the Honours degree. Students who do not complete or fail the work placement year will be transferred to the three-year mathematics programme. Failure of the work placement year will be recorded on a student's final transcript.

## 10. How is the Programme assessed?

The wide variety of assessment methods used within Mathematics at Keele reflects the broad range of knowledge and skills that are developed as you progress through the degree programme. Teaching staff pay particular attention to specifying clear assessment criteria and providing timely, regular and constructive feedback that helps to clarify things you did not understand and helps you to improve your performance. The following list is representative of the variety of assessment methods used within Mathematics:

- **Unseen examinations:** test a student's knowledge and understanding of mathematics. They are the usual, primary mode of assessment in mathematics programmes across the HE sector. Such examinations are of two hours in length and all questions are compulsory. Virtually all taught modules in Levels 4 to 7 have unseen examinations as part of the assessment profile
- **Class tests:** these are taken during the course of a module, usually in a lecture slot. They are intended to assess a student's current understanding and subject knowledge in that module in a structured and focused manner. Virtually all taught modules in Levels 4 to 6 have class tests as part of the assessment profile
- **Coursework:** normally consists of regular short assignments designed to assess, in more depth than class tests, a student's knowledge and understanding of the course material. Some of these assignments may be computer-based and some may take the form of short reports
- **Short reports:** for which students are required to write up their own account of small group studies and discussions on particular topics

- **Project Reports:** are formal summaries of the work done by a student undertaking a project. Where the project is the review of an area of mathematics the report tests the student's ability to evaluate the material and identify and summarise the key points. Statistics projects often involve the analysis of real-world data and the report will test the student's ability to make critical judgements concerning the appropriateness of different strategies for the collection and analysis of such data. For projects involving mathematical modelling the report tests the student's ability to construct appropriate models, make realistic simplifying assumptions, and use the model effectively to analyse the problem
- **Video presentations:** where students produce an informative video presentation suitable for a general audience which explains their project, its purpose and the outcomes. These videos are presented to the class and can be live, animated, or a combination of both
- **Oral presentations:** assess a student's ability to communicate their knowledge and understanding, both visually and orally, to both general and academic audiences

Marks are awarded for summative assessments designed to assess your achievement of learning outcomes. You will also be assessed formatively to enable you to monitor your own progress and to assist staff in identifying and addressing any specific learning needs. Feedback, including guidance on how you can improve the quality of your work, is also provided on all summative assessments within three working weeks of submission, unless there are compelling circumstances that make this impossible, and more informally in the course of tutorial and seminar discussions.

Feedback, including guidance on how students can improve the quality of their work, is also provided on all summative assessments within three working weeks of submission, unless there are compelling circumstances that make this impossible, and more informally in the course of tutorial and seminar discussions.

## 11. Contact Time and Expected Workload

This contact time measure is intended to provide you with an indication of the type of activity you are likely to undertake during this programme. The data is compiled based on module choices and learning patterns of students on similar programmes in previous years. Every effort is made to ensure this data is a realistic representation of what you are likely to experience, but changes to programmes, teaching methods and assessment methods mean this data is representative and not specific.

Undergraduate courses at Keele contain an element of module choice; therefore, individual students will experience a different mix of contact time and assessment types dependent upon their own individual choice of modules. The figures below are an example of activities that a student may expect on your chosen course by year/stage of study. Contact time includes scheduled activities such as: lecture, seminar, tutorial, project supervision, demonstration, practical classes and labs, supervised time in labs/workshop, fieldwork and external visits. The figures are based on 1,200 hours of student effort each year for full-time students.

Activity	Year 1 (Level 4)	Year 2 (Level 5)	Year 3 (Level 6)	Year 4 (Level 7)
Scheduled learning and teaching activities	32%	32%	25%	19%
Guided independent Study	68%	68%	75%	81%
Placements	0%	0%	0%	0%

## 12. Accreditation

The Master in Mathematics, Master in Mathematics with International Year, and Master in Mathematics with Work Placement Year programmes are accredited by the Institute of Mathematics and its Applications (IMA).

## 13. Regulations

The University Regulations form the framework for learning, teaching and assessment and other aspects of the student experience. Further information about the University Regulations can be found at: <http://www.keele.ac.uk/student-agreement/>

## Mathematics Regulations

### **i. Transfer onto and off the MMath Programme**

- a) Regulation 1F, paragraph 2.1 states the rules governing admission onto an Integrated Masters programme. This regulation will apply to the MMath Mathematics Programme with the following exceptions to the progression requirements in section 10.1:
  - i. In section 10.1, disregard 10.1.(b);
  - ii. In section 10.2 replace 'Lower Second Class' with 'Upper Second Class'.
- b) Single Honours BSc Mathematics students will be permitted to transfer onto the MMath Programme at any point up to the end of Level 5, subject to having met any relevant progression criteria and, in any event, only with the approval of the Programme Director. Dual Honours BSc Mathematics students will, subject to the same considerations, normally be permitted to transfer onto the MMath Programme within two weeks of the commencement of Level 5.
- c) MMath students will be permitted to transfer to an approved Mathematics Bachelors programme at any point up to the end of week eight of the second semester of Level 6.

*(International students only)* Due to the UK Home Office Visa restrictions, students who enrol on the MMath programme are not able to transfer to the BSc Mathematics level at any point during the course apart from at the level 6 boards, where a student would exit and complete with an award of BSc Mathematics. If an international student wishes or is required to transfer to the BSc Mathematics they will need to apply for a new Visa from outside the UK at their own cost before the switch could be completed. Students who find themselves in these circumstances will need to speak to International Student Support (Student Services Centre) to go over the consequences of the transfer and the timings of a new Visa application from outside the UK.

### **ii. Progression**

- a) The rules governing progression from one level of study to the next are governed by the University's Regulation 1F (Section 10). This regulation can be found at the following web address: <http://www.keele.ac.uk/regulations/regulation1f/>
- b) This regulation will apply to the MMath Mathematics Programme with the following exceptions:
  - i. In section 10.1, disregard 10.1.(b);
  - ii. Section 10.2 shall be amended as follows: To progress from FHEQ Level 6 to FHEQ Level 7 a student must normally at least satisfy the requirements under Regulation 1A for the award of an Honours Degree in the Upper Second Honours category.

### **iii. Degree Award**

- a) The algorithm for the award of a given degree classification can be found at the following web address: <http://www.keele.ac.uk/paa/academicadministration/degreeclassification/integratedmastersdegrees>
- b) Module Condonement is permitted on the Master in Mathematics programme. The rules governing module condonement are the subject of Section 11 of Regulation 1F and can also be found at the above web address.
- c) In addition to module condonement, Mathematics also applies module compensation. This allows for, in exceptional circumstance, the granting by the Mathematics Examination Board of full credits for a module in which the student has scored less than 29%.
- d) The maximum amount of condonement and compensation that can be applied can be found at the following web address: <https://www.keele.ac.uk/qa/degreeclassification/dualhonourssinglehonoursbachelordegrees/dualhonourssinglehonoursbachelordegreesregulation1afromseptember2013/modulecompensation/> Compensation is entirely at the discretion of the Mathematics Exam Board. At Level 5, normally the Mathematics Exam Board will not compensate 15 credits where another Level 5 15 credit module is failed between 30 and 38.
- e) Any student reverting to Honours Degree candidature under the Provisions of University Regulation 1F, or 6.2(c) above, shall be awarded a Single Honours Mathematics BSc degree.

- f) For students who entered Level 4 or repeated Level 4 in full in the 2013/14 academic year or earlier, and who revert to Honours Degree candidature as in 6.8(e) above shall be awarded a Mathematics Major BSc degree.

#### 14. What are the typical admission requirements for the programme?

Subject	A-level	Subjects not included	International Baccalaureate	BTEC	Access to Higher Education Diploma	GCSE requirements
Mathematics (MMath)	AAB for applicants taking Maths only (grade A in Maths) or ABB for applicants taking Maths and Further Maths (grade A in either Maths or Further Maths)	General Studies and Critical Thinking	36 points to include Higher Level Mathematics at 6 or above.	DDD You must have taken sufficient Mathematics units, please contact us for advice.	Obtain Access to Higher Education Diploma with 30 Level 3 credits at Distinction. You must also have taken sufficient Mathematics credits, please contact us for advice.	Maths @ C (or 4) English Lang @ C (or 4)

Applicants who are not currently undertaking any formal study or who have been out of formal education for more than 3 years and are not qualified to A-level or BTEC standard may be offered entry to the University's Foundation Year Programme.

Applicants for whom English is not a first language must provide evidence of a recognised qualification in English language. The minimum score for entry to the Programme is Academic IELTS 6.0 or equivalent.

Please note: All non-native English speaking students are required to undertake a diagnostic English language assessment on arrival at Keele, to determine whether English language support may help them succeed with their studies. An English language module may be compulsory for some students during their first year at Keele.

Accreditation of Prior Learning (APL) is considered on a case-by-case basis and those interested should contact the Programme Director. The University's guidelines on this can be found here:

<http://www.keele.ac.uk/qa/accreditationofpriorlearning/>

#### 15. How are students supported on the programme?

Support for student learning and welfare is provided in a number of ways.

- Module leaders and Examples Class tutors are responsible for providing learning support on the individual modules. They also give feedback on all summative and formative assessment, from individual feedback on coursework to more general feedback on examinations.
- The members of academic staff in Mathematics operate an open-door policy whereby lecturers and tutors are happy to see and advise students at any reasonable time or by mutually convenient appointment.
- Every student enrolled on the Programme will be allocated a Personal Tutor who is responsible for reviewing and advising on the student's academic progress throughout their time on the Programme. Students should approach their personal Tutor, in the first instance, if they are experiencing issues with any part of the Programme.
- Personal Tutors also act as a first point of contact on any non-academic issues that may be affecting their learning and can also refer students to a range of specialist health, welfare and financial services coordinated by Student Services.
- There is a Year Tutor Team for each of the four years of the Programme. Each of these teams normally comprises of two or three members of academic staff. The role of the Year Tutor Teams is to provide general support for students, though they will deal specifically with course and module

changes, attendance monitoring and the extenuating circumstances procedure.

- The Mathematics Learning and Technology Officer provides help and advice to students concerning work on the computers in the laboratory.

## **16. Learning Resources**

Mathematics is taught, primarily, in lecture theatres equipped with whiteboards and screens for use with either visualisers or PC tablets. The majority of modules provide partial or full lecture notes in paper or electronic form (or both). There is a computer laboratory within Mathematics and, in addition, as part of the School of Computing and Mathematics, students have access to the large computer science laboratory. There is also a room reserved exclusively for private study.

The learning resources available to students on the Programme include:

- the extensive collection of books and journals relevant to undergraduate study held in the University library (much of this material is also accessible online);
- detailed printed notes and other paper resources supplied in certain modules;
- the Keele Learning Environment (KLE) which provides easy access to a range of learning resources including lecture notes, examples with solutions, past examination papers, module details and reading lists, and guidance notes for project work.

## **17. Other learning opportunities**

### **Study abroad (semester)**

Students on the MMath programme have the potential opportunity to spend a semester abroad in their second year studying at one of Keele's international partner universities.

Exactly which countries are available depends on the student's choice of degree subjects. An indicative list of countries is on the website (<http://www.keele.ac.uk/studyabroad/partneruniversities/>); however this does not guarantee the availability of study in a specific country as this is subject to the University's application process for studying abroad.

No additional tuition fees are payable for a single semester studying abroad but students do have to bear the costs of travelling to and from their destination university, accommodation, food and personal costs. Depending on the destination they are studying at additional costs may include visas, study permits, residence permits, and compulsory health checks. Students should expect the total costs of studying abroad to be greater than if they study in the UK, information is made available from the Global Education Team throughout the process, as costs will vary depending on destination

Whilst students are studying abroad any Student Finance eligibility will continue, where applicable students may be eligible for specific travel or disability grants. Students studying in Erasmus+ destinations may be eligible for grants as part of this programme. Students studying outside of this programme may be eligible for income dependent bursaries at Keele.

Students travel on a comprehensive Keele University insurance plan, for which there are currently no additional charges. Some governments and/or universities require additional compulsory health coverage plans; costs for this will be advised during the application process.

### **Study Abroad (International Year)**

A summary of the International Year, which is a potential option for students after completion of Year 2 (Level 5), is provided at Annex A.

### **Work Placement Year**

A summary of the Work Placement Year, which is a potential option for students after completion of year 2 (Level 5), is provided at Annex B.

## **18. Additional costs**

As to be expected there will be additional costs for inter-library loans and potential overdue library fines, print and graduation.

We do not anticipate any further additional costs for this undergraduate programme.

## **19. Quality management and enhancement**

The quality and standards of learning in Mathematics are subject to a continuous process of monitoring, review and enhancement.

- The Learning and Teaching Committee of the School of Computing & Mathematics is responsible for reviewing and monitoring quality management and enhancement procedures and activities across the School.
- Individual modules and the Mathematics MMath Programme as a whole are reviewed and enhanced every year in the annual programme review which takes place at the end of the academic year and as part of the University's Curriculum Annual Review and Development (CARD) process.
- The School operates a process of peer observation of teaching, whereby members of academic staff critically evaluate the teaching of one another.
- Continuous Professional Development is available to all staff.
- The programmes are run in accordance with the University's Quality Assurance procedures and are subject to periodic reviews under the Internal Quality Audit (IQA) process.

Student evaluation of, and feedback on, the quality of learning on every MMath module takes place every year using a variety of different methods:

- The results of student evaluations of all modules are reported to module leaders and reviewed by the Programme Committee as part of the Curriculum Annual Review and Development (CARD) process.
- Findings related to the Mathematics Programmes from the annual National Student Survey (NSS), and from regular surveys of the student experience conducted by the University, are subjected to careful analysis and a planned response at programme and School level.
- Feedback received from representatives of students in all four years of the MMath Programme is considered and acted on at regular meetings of the Programme's Student Staff Voice Committee.

The University appoints senior members of academic staff from other universities to act as external examiners on all programmes. They are responsible for:

- Approving examination questions
- Confirming all marks which contribute to a student's degree
- Reviewing and giving advice on the structure and content of the programme and assessment procedures

Information about current external examiner(s) can be found here:

<http://www.keele.ac.uk/qa/externalexaminers/currentexternalexaminers/>

## **20. The principles of programme design**

The Mathematics Programmes described in this document have been drawn up with reference to, and in accordance with the guidance set out in, the following documents:

- a. UK Quality Code for Higher Education, Quality Assurance Agency for Higher Education: <http://www.qaa.ac.uk/en/quality-code/>
- b. QAA Subject Benchmark Statement: Mathematics, Statistics and Operational Research (2015) – [http://www.qaa.ac.uk/docs/qaa/subject-benchmark-statements/sbs-mathematics-15-masters.pdf?sfvrsn=7891f681\\_20](http://www.qaa.ac.uk/docs/qaa/subject-benchmark-statements/sbs-mathematics-15-masters.pdf?sfvrsn=7891f681_20)
- c. Keele University Regulations and Guidance for Students and Staff: <http://www.keele.ac.uk/regulations>
- d. Keele University Placement Learning Code of Practice: <https://www.keele.ac.uk/policyzone/viewbyowner/planningandacademicadministration/name,117421,en.php>

## 21. Document Version History

Version history	Date	Notes
Date first created	October 2016	
Revision history	V2.0: March 2017	Changes to Level 4 core modules (Algebra and Calculus) with 2x15-credit modules replaced with 30-credit versions in order to provide students with a more cohesive introduction to the core algebra and calculus topics. [Major change: reissued]
	V3.0: December 2017	Changes to reflect addition of the Work Placement Year option  Minor change to Level 7 optional modules to include one additional module. [Major change: reissue]
	V3.1: February 2018	Updated to reflect module option offering for 2018-19: changes to year 3 and 4 optional modules.  Updated 13.i(a) so that it is self-contained and does not make reference to separate Course Regulations document. [minor – no reissue]
	V3.2: August 2018	Clarification included in the Course Regulations section about the restrictions on course transfer for International students due to UK Visa & Immigration rules. Added IMA accreditation. Deleted “Ring and Field Theory” and “Module Theory” Rephrased Compensation Course Regulation to align with University’s changes to Condonement and Compensation. [minor]
	V3.3: December 2018	Change of optional module in year 4: ‘Field and Galois Theory’ replaces ‘Algebraic Number Theory’ [minor]
	V3.4: June 2019	At Level 6: removed “Metric Spaces and Topology”; removed “Medical Statistics Project”; removed “Applied Time Series”; added “Complex Variable II”; added “Project (30-credits). (All optional modules.) Change of optional module in year 4: ‘Topics in

		Group Theory' replaces 'Symmetric Differential Equations' [minor]
Date approved	17/03/2017	

## Annex A for Single Honours Programmes

### International Year Programme

Students registered for Single Honours MMath Integrated Masters may either be admitted for or apply to transfer during their period of study at Level 5 to the Single Honours 'MMath Integrated Masters with International Year'. Students accepted onto the International Year programme will have an extra year of study at an international partner institution after they have completed Year 2 (Level 5) at Keele.

Students who successfully complete both the second year (Level 5) and the International Year will be permitted to progress to Level 6. Students who fail to satisfy the examiners in respect of the International Year will normally revert to the Dual Honours programme without the International Year and progress to Level 6 on that basis. The failure will be recorded on the student's final transcript.

Study at Level 4, Level 5, Level 6 and Level 7 will be as per the main body of this document. The additional detail contained in this annex will pertain solely to students registered for 'MMath Integrated Masters with International Year'.

### International Year Programme Aims

In addition to the programme aims specified in the main body of this document, the international year programme of study aims to provide students with:

1. Personal development as a student and a researcher with an appreciation of the international dimension of their subject
2. Experience of a different culture, academically, professionally and socially

### Entry Requirements for the International Year

Students may apply to the 4-year programme during Level 5. Admission to the International Year is subject to successful application, interview and references from appropriate staff.

The criteria to be applied are:

- Academic Performance (an average of 60% across all modules at Level 5 is normally required)
- General Aptitude (to be demonstrated by application for study abroad, interview during the 2<sup>nd</sup> semester of year 2 (Level 5), and by recommendation of the student's personal tutor, 1<sup>st</sup> and 2<sup>nd</sup> year tutors and programme director)

### Student Support

Students will be supported whilst on the International Year via the following methods:

- Phone or Skype conversations with Study Abroad tutors, in line with recommended Personal Tutoring meeting points.
- Support from the University's Global Education Team

### Learning Outcomes

In addition to the learning outcomes specified in the main text of the Programme Specification, students who complete a Keele undergraduate programme with International Year will be able to:

- a. Describe, discuss and reflect upon the cultural and international differences and similarities of different learning environments
- b. Discuss the benefits and challenges of global citizenship and internationalisation
- c. Explain how their perspective on their academic discipline has been influenced by locating it within an international setting.

In addition, students who complete 'MMath Integrated Masters with International Year' will be able to:

- i. communicate effectively in an international setting;

- ii. reflect on previous learning within an international context.

Please note that students on Dual Honours programmes with International Year must meet the subject-specific learning outcomes for BOTH their principal subjects.

These learning outcomes will all be assessed by the submission of a satisfactory individual learning agreement, the successful completion of assessments at the partner institution and the submission of the reflective portfolio element of the international year module.

### **Course Regulations**

Students registered for the MMath Integrated Masters with International Year' are subject to the course specific regulations (if any) and the University regulations. In addition, during the International Year, the following regulations will apply:

Students undertaking the International Year must complete 120 credits, which must comprise *at least 40%* in the student's discipline areas.

This may impact on your choice of modules to study, for example you will have to choose certain modules to ensure you have the discipline specific credits required.

Students are barred from studying any Mathematics module with significant overlap to Level 6 modules to be studied on their return. Significant overlap with Level 5 modules previously studied should also be avoided.

### **Additional costs for the International Year**

Tuition fees for students on the International Year will be charged at 15% of the annual tuition fees for that year of study, as set out in Section 1. The International Year can be included in your Student Finance allocation, to find out more about your personal eligibility see: [www.gov.uk](http://www.gov.uk)

Students will have to bear the costs of travelling to and from their destination university, accommodation, food and personal costs. Depending on the destination they are studying at additional costs may include visas, study permits, residence permits, and compulsory health checks. Students should expect the total costs of studying abroad be greater than if they study in the UK, information is made available from the Global Education Team throughout the process, as costs will vary depending on destination.

Students studying in Erasmus+ destinations may be eligible for grants as part of this programme. Students studying outside of this programme may be eligible income dependent bursaries at Keele.

Students travel on a comprehensive Keele University insurance plan, for which there are currently no additional charges. Some Governments and/or universities require additional compulsory health coverage plans; costs for this will be advised during the application process.

## Annex B

### Master in Mathematics with Placement Year

#### Placement Year Programme

Students have the opportunity to apply directly for the 5-year with Work Placement Year degree programme or to transfer onto the 5-year degree programme at the end of Year-1 and in Year-2 at the end of Semester 1. Students accepted onto this programme will have an extra year (the Placement Year) with a relevant placement provider after they have completed Year 2 (Level 5) at Keele. Students wishing to transfer onto this programme should discuss this with student support, the academic tutor for the work placement year, and the Programme Director.

To proceed to the Placement Year, students must normally achieve an average of 55% across all Level 4 and 5 modules and undergo an interview with the Programme Director or the Academic Tutor for the Work Placement Year. If students do not meet these requirements they will revert back to the Single Honours Mathematics Programme.

Students who successfully complete both the second year (Level 5) and the Placement Year will be permitted to progress to Level 6. Students who fail to satisfactorily complete the Placement Year will normally revert to the BSc (Hons) Mathematics programme and progress to Level 6 on that basis. The failure will be recorded on the student's final transcript.

Study at Level 4, Level 5, Level 6 and Level 7 will be as per the main body of this document. The additional detail contained in this annex will pertain solely to students registered for the MMath (Hons) Mathematics with Work Placement Year.

#### Work Placement Year Programme Aims

In addition to the programme aims specified in the main body of this document, the Placement Year programme aims to provide students with:

- a) Substantial experience of work with a relevant placement provider, including familiarisation with the professional working environment;
- b) enable you to apply academic theory learned as part of your taught degree to real situations in the work place, and to expand your employability skills.

#### Entry Requirements for the International Year

Admission to the Placement Year is subject to successful application, interview and references from appropriate staff. Students have the opportunity to apply directly for the 5-year 'with work placement' degree programme, or to transfer onto the 5-year degree programme at the end of Year 1 (Level 4) and in Year 2 (Level 5) at the end of Semester 1. Students who are initially registered for the 5-year degree programme may transfer onto the 4-year degree programme at any point in time, prior to undertaking the year-long work placement. Students who fail to pass the work placement year, and those who fail to meet the minimum requirements of the work placement year module (minimum 30 weeks full-time (1050 hours), or equivalent, work placement), will automatically transfer onto the 4-year degree programme.

The criteria applied are:

- a) Students must have a good University attendance record and be in 'good academic standing'.
- b) Students must have passed all Year-1 and Year-2 Semester 1 modules with an overall module average of 55% or higher.
- c) General Aptitude (to be demonstrated by the application(s) to relevant placement providers with prior

agreement from the Programme Director or the Academic Tutor for the Work Placement Year, interview during the 2<sup>nd</sup> semester of Year 2 (Level 5), and by recommendation of the student's personal tutor and as necessary, other staff members).

- d) Students undertaking work placements will be expected to complete a Health and Safety checklist prior to commencing their work placement and will be required to satisfy the Health and Safety regulations of the company or organization at which they are based.
- e) Students must have met the progression requirements to proceed to their final year of study prior to commencing a work placement. Failure to complete reassessment work in the summer reassessment period due to a work placement position will not be classed as exceptional circumstances.
- f) (*International students only*) Due to visa requirements, it is not possible for international students who require a Tier 4 Visa to apply for direct entry onto the 4-year with Work Placement Year degree programme. Students should be aware that there are visa implications for this transfer, and it is the student's responsibility to complete any and all necessary processes to be eligible for this programme. There may be additional costs, including applying for a new Visa from outside of the UK for international students associated with a transfer to the work placement programme.

A student that has completed an International Year (see Annex A) will not be allowed to transfer onto the Work Placement Year Programme. Students registered for MMath (Hons) Mathematics with Work Placement are exempt from studying an International Year.

### **Student Support**

Students will be supported whilst on the Placement Year via the following methods:

- a) Regular contact between the student and a named member of staff (Academic Tutor for Work Placement Year) who will be assigned to the student as their University supervisor. The University supervisor will be in regular contact with the student throughout the year, and be on hand to provide advice (pastoral or academic) and liaise with the placement supervisor on the student's behalf if required.
- b) Two formal contacts with the student during the academic year: the University supervisor will visit the student in their placement organisation at around the 5<sup>th</sup> week after the placement commenced, and then visit again (or conduct telephone/video call tutorial) around the 15<sup>th</sup> week after the placement commenced.
- c) Weekly supervision session will take place with the placement supervisor (or their nominee) throughout the duration of the placement.

### **Learning Outcomes**

In addition to the learning outcomes specified in the main text of the Programme Specification, students who complete MMath (Hons) Mathematics with Placement Year will be able to:

- a) evaluate their own employability skills (via a SWOT analysis);
- b) create Intended Learning Outcomes for their placement in order to develop the skills areas which they have identified as needing further enhancement;
- c) develop, through practice in the work place, the work-related skills identified through their SWOT analysis and Intended Learning Outcomes;
- d) apply academic theory learned as part of their taught degree to real situations in the work place;
- e) reflect on their work placement activities and evaluate their impact on their own employability skills;
- f) explain how the sector of the placement operates and identify the skills required to pursue careers within the sector.

These learning outcomes will be assessed through the non-credit bearing Work Placement Year module (MAT-30035) which involves:

- g) the submission of a SWOT analysis and action plan and an evaluation of the student's performance based on the placement supervisor's initial report;
- h) the submission of a monthly reflective diary to the University supervisor and an evaluation of the student's performance based on the placement supervisor's final report;
- i) a presentation about their placement experience to an audience of other students coming off placement and those about to go out on placement. The audience is also likely to contain the University supervisor and other staff from Mathematics;

### **Course Regulations**

Students registered for the 'MMath (Hons) Mathematics with Work Placement Year' are subject to the course specific regulations (if any) and the University regulations. In addition, during the Placement Year, the following regulations will apply.

Students undertaking the Work Placement Year must successfully complete the 0 credit 'Work Placement Year' module (MAT-30035). In particular, the following regulations will apply:

- a) Students must pass Assessment 1 (mid-placement portfolio) with a mark of 40% in order to continue with their work placement and pass the Work Placement Year module. Students will not be permitted to take reassessment of this component of the module.
- b) Students failing Assessment 1 at first attempt will be required to withdraw from the Work Placement Year module and will be transferred onto the 4-year degree programme.
- c) Students will be permitted to take reassessment of Assessment 2 (Final Placement Portfolio) and Assessment 3 (Oral Presentation), as appropriate. Students are not permitted to repeat the Work Placement Year.

Students will be expected to behave professionally in terms of:

- d) conforming to the work practices of the organisation; and
- e) remembering that they are representatives of the University and their actions will reflect on the Mathematics Division and have an impact on that organisation's willingness (or otherwise) to remain engaged with the mathematics placement.

### **Additional costs/payments for the Placement Year**

Tuition fees for students on the Placement Year will be charged at 20% of the annual tuition fees for that year of study, as set out in Section 1. The Work Placement Year can be included in your Student Finance allocation, to find out more about your personal eligibility see [www.gov.uk](http://www.gov.uk). It is the student's responsibility to notify Student Finance (England, Wales, Scotland, Northern Ireland, as appropriate), the Student Loans Company, and any other relevant funding bodies (as appropriate) of any change in their status. Students who undertake paid work placements should discuss the implications of this with Student Finance, the Student Loans Company and any other relevant funding body prior to commencing the placement.

Students will have to bear the costs of travelling to and from their placement provider, accommodation, food and personal costs. Depending on the placement provider additional costs may include parking permits, travel and transport, suitable clothing, DBS checks, and compulsory health checks.

International students who require a Tier 4 visa should check with the Immigration Compliance team prior to commencing any type of paid placement to ensure that they are not contravening their visa requirements.