

Programme Specification: Undergraduate

For Academic Year 2025/26

1. Course Summary

Names of programme and award title(s)	Master in Mathematics (MMath) Master in Mathematics with International Year (see Annex for details) Master in Mathematics with Work Placement Year (see Annex for details)
Award type	Single Honours (Masters)
Mode of study	Full-time
Framework of Higher Education Qualification (FHEQ) level of final award	Level 7
Normal length of the programme	4 years; 5 years with either the International Year or Placement Year between years 2 and 3
Maximum period of registration	The normal length as specified above plus 3 years
Location of study	Keele Campus
Accreditation (if applicable)	All of the BSc (Hons) degrees are accredited by the Institute of Mathematics and its Applications (IMA)
Regulator	Office for Students (OfS)
Tuition Fees	<p>UK students:</p> <p>Fee for 2025/26 is £9,535*</p> <p>International students:</p> <p>Fee for 2025/26 is £17,700**</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>

Please note that this document applies to Level 4 (Year 1) students only in 2025/26. Level 5 (Year 2) and Level 6 (Year 3) students should refer instead to the document labelled 2024/25.

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/>

*** These fees are for new students. 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?

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.

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.

3. Overview of the Programme

Accelerate your career in mathematics by gaining advanced practical, technical and research skills. Our four-year Integrated Master's is ideal for those wishing to pursue a research career or gain a competitive edge in the graduate employment market. The degree shares the same core as our BSc, however, allows you to explore the areas of interest in Pure or Applied Mathematics to a greater depth, both via specialised fourth-year modules as well as a substantial research project.

Mathematics is a traditional discipline with a very long history. The Programme provides a broad coverage of the three main discipline areas of pure mathematics, applied mathematics and statistics. Pure mathematics is concerned with mathematical proof, logical argument and abstraction. Applied mathematics is concerned with methods and their application to modelling real-world problems. Statistics concerns mathematical modelling of uncertainty and the analysis of data. The Programme has been designed to give flexibility with many options in the third year, which allows students to pick options within their broad field of interest and to study topics to some depth. The final, fourth year is aimed at significantly deeper focused studies within either Pure or Applied Mathematics fields, through specialised modules and a weighty research project. In addition to subject-specific skills, the Programme also provides students with generic and employability skills.

4. Aims of the programme

In line with the Quality Assurance Agency (QAA) 2023 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:

- develop your knowledge, understanding and skills relevant to discrete and continuous mathematics, including logical argument, rigorous mathematical proof, problem solving and mathematical modelling;
- develop your knowledge, understanding and skills relevant to statistical theory, methods of data analysis, the formulation and investigation of probability-based models to make inferences from samples, and applications of statistics;
- explore interest in mathematics within a caring and intellectually stimulating environment;
- emerge as a skilled and motivated graduate who is suitably prepared for further study or for employment within or outside the field;
- gain a range of subject-specific and employability skills, particularly in any area where precise, logical thought and problem-solving skills are valued;
- cultivate appreciation of the beauty, elegance and practicality of mathematics;
- establish a foundation for life-long learning, study and enquiry in mathematics.
- possess a good understanding of the main body of knowledge for the course of study, including some advanced topics
- have a good level of skill in calculation and manipulation of the material within this body of knowledge, and be capable of solving advanced problems formulated within it
- apply of a range of concepts and principles in loosely defined contexts, showing good judgement in the selection and application of tools and techniques and demonstrating justification of the methods used
- demonstrate a good level of capability in developing and evaluating logical arguments
- have a good level of skill in comprehending problems, formulating them mathematically, obtaining solutions by appropriate methods, and drawing valid inferences from these
- confidently and effectively communicate with logical arguments, evidence and conclusions accurately and clearly, and, if appropriate, acknowledge the degree of uncertainty associated with conclusions
- be familiar with at least one programming language and competent use of other appropriate MSOR technology

- be able to work competently and independently, to be aware of own strengths and to understand when help is needed
- be competent in planning and conducting an advanced project in mathematics, statistics or a related topic area.

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
- Intellectual skills

Subject knowledge and understanding

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

- mathematical methods and techniques in the areas of calculus, algebra, differential equations, vector calculus, complex variable, abstract algebra, and probability;
- the use of mathematical notation;
- the role of logical mathematical argument and deductive reasoning, including the formal process of mathematical proof;
- using a structured mathematical or analytical approach to problem solving;
- the science of data investigation and data visualisation and the applications of statistics;
- probability-based models, hypothesis testing, statistical inference and likelihood;
- the power of generalisation and abstraction;
- the application of mathematical modelling techniques to the solution of real-world problems;
- mathematical word processing tools and symbolic manipulation packages;

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

- 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;
- apply knowledge and problem-solving abilities in new or unfamiliar environments and within broader contexts;
- integrate knowledge and handle complexity, and formulate judgements with incomplete or limited information;
- communicate conclusions and the knowledge and rationale underpinning these, to specialist and nonspecialist audiences, clearly and unambiguously;
- 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:

- demonstrate knowledge of key mathematical and statistical concepts, both explicitly and by applying them to the solution of mathematical problems;
- comprehend problems, abstract their essentials and formulate them in symbolic form so as to facilitate their analysis and solution, and understand how mathematical and statistical processes may be applied to them;
- select and apply appropriate mathematical and statistical techniques;
- use models to analyse an underlying problem and to interpret the results of this analysis;
- understand the importance of assumptions made in mathematical and statistical models, be aware of when and where they are used and possible consequences of their violation;
- construct and develop logical mathematical arguments with clear identification of assumptions and conclusions;
- reason critically, carefully and logically and derive (prove) mathematical results;
- persist with a problem until its successful conclusion;
- make critical interpretation of data and text;
- abstract and synthesise information;
- demonstrate facility with mathematical abstraction;
- demonstrate skills designing observational studies, analysing data resulting from them, and formulating and testing hypotheses
- use an advanced symbolic manipulation package, statistical packages and mathematics typesetting software;

- research and write up a topic in the style of an academic journal article.

Key or transferable skills (including employability skills)

Successful students will be able to:

- develop and sustain effective approaches to learning and study, including time management, organisational skills, flexibility, creativity and intellectual integrity;
- acquire, analyse, synthesise, summarise and present information and ideas from a range of sources;
- be adaptable, in particular display a readiness to address new problems from new areas;
- work effectively with information technology;
- communicate effectively and coherently by written and spoken means using appropriate techniques;
- transfer knowledge from one context to another, and to approach problems analytically and to assess them logically;
- work comfortably with numerate concepts and arguments in all stages of work;
- work independently or with others to achieve an objective;
- motivate themselves and sustain that motivation over an extended period of time.

Keele Graduate Attributes

The Keele Graduate Attributes are the qualities (skills, values and mindsets) which you will have the opportunity to develop during your time at Keele through both the formal curriculum and also through co- and extra-curricular activities (e.g., work experience, and engagement with the wider University community such as acting as ambassadors, volunteering, peer mentoring, student representation, membership and leadership of clubs and societies). Our Graduate Attributes consist of four themes: **academic expertise, professional skills, personal effectiveness, and social and ethical responsibility**. You will have opportunities to engage actively with the range of attributes throughout your time at Keele: through your academic studies, through self-assessing your own strengths, weaknesses, and development needs, and by setting personal development goals. You will have opportunities to discuss your progress in developing graduate attributes with, for example, Academic Mentors, to prepare for your future career and lives beyond Keele.

6. How is the programme taught?

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

- **Lectures** where the lecturer provides students with detailed notes, typically backed up by pre-prepared notes, together with references to textbooks, as is the norm in the discipline;
- **Tutorial Classes** that are more informal than the lectures and provide the class tutor with the opportunity to revise and enforce core ideas and to provide students with more worked examples. It is also the opportunity for students to try problems themselves and to discuss solutions with their peers, under the supervision of the tutor, who provides immediate feedback
- **Practical sessions** in the computer laboratories, in which students use the PCs interactively and are provided with feedback by the computer and the tutor
- **Independent study** based on processing lecture notes and materials of tutorial classes, as well as reading textbooks, together with attempting regular exercises and coursework assignments
- **Web-based learning** using the University's virtual learning environment (KLE). The KLE is used to give students easy access to a wide range of resources, and as a platform for online discussions
- 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 Academic Mentors or module lecturers on a one-to-one basis.

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

- Lectures and independent study allow students to gain knowledge and understanding of the three broad areas of mathematics.
- Tutorial Classes provide opportunities for students to ask questions about, and suggest answers to mathematical problems, and to present their own ideas to members of staff and other students using an appropriate medium of communication.
- Independent study, in particular, the regular coursework assignments, encourages students to reflect on their own learning and take responsibility for its development by addressing areas of difficulty, perhaps by discussing them with their fellow students or by getting additional help from a member of staff.
- Undertaking a project with the support of an experienced researcher allows students to formulate relevant research questions and devise a feasible strategy to answer them.

7. Teaching Staff

The Mathematics academic staff comprises of a number of Professors, Readers, Senior Lecturers, and Lecturers. Most members of staff are active in research and also hold teaching qualifications. Some of the staff are internationally leading figures in their research areas.

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 two types of module delivered as part of your programme. They are:

- Compulsory modules - a module that you are required to study on this course;
- Optional modules - these allow you some limited choice of what to study from a list of modules.

Global Challenge Pathways

This programme includes the option for you to take a Global Challenge Pathway. These modules offer you an exciting opportunity to work with students and staff from different disciplines to explore topical global issues such as power and conflict, health inequalities, climate change, generative AI, social justice, global citizenship, and enterprise from different perspectives.

Global Challenge Pathways can either be taken as one 15-credit module at Levels 4, 5 and 6, or one 15-credit module at Levels 5 and 6. For more information about our Global Challenge Pathways please visit:

<https://www.keele.ac.uk/study/undergraduate/globalchallengepathways/>

Modern Languages or Certificate in TESOL

Alternatively, you could choose to study modules with the University Language Centre. The Language Centre offers three pathways; The Language Specialist, The Language Taster, and The Trinity Certificate in Teaching English to Speakers of Other Language (TESOL). Language Centre modules are available separately for students at Level 4. At Levels 5 and 6 they are included within the Global Challenge Pathways.

If you choose the Language Specialist pathway, you will automatically be enrolled on a Semester 2 Modern Language module as a continuation of your language of choice as a faculty funded 'additional' module. Undertaking a Modern Languages module in Semester 2 is compulsory if you wish to continue to the Language Specialist Global Challenge Pathway the following academic year.

For more information about Language Centre option modules available to you please visit the following webpages.

For new (Level 4) students please visit: <https://www.keele.ac.uk/study/languagecentre/>

For current (Level 5 and Level 6) students please visit: <https://www.keele.ac.uk/students/academiclife/global-challenge-pathways/>

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

<https://www.keele.ac.uk/recordsandexams/modulecatalogue/>

A summary of the credit requirements per year is as follows.

Year	Compulsory	Optional	
		Min	Max
Level 4	105	15	15
Level 5	105	15	15
Level 6	15	105	105
Level 7	60	60	60

Module Lists

Level 4

Compulsory modules	Module Code	Credits	Period
Mathematical Methods	MAT-10043	15	Semester 1
Sets, Functions and Proofs	MAT-10071	15	Semester 1
Limits, Series and Calculus	MAT-10079	15	Semester 1
Mathematical Communication, Investigations and Problem Solving	MAT-10069	30	Semester 1-2
Linear algebra	MAT-10073	15	Semester 2
Differential Equations and Multivariable Calculus	MAT-10075	15	Semester 2

Optional modules	Module Code	Credits	Period
Introduction to Algorithms	CSC-10064	15	Semester 2
Statistics with Applications in R	MAT-10077	15	Semester 2

Level 4 Module Rules

At Level 4, students take 105 credits of compulsory modules. The remaining 15 credits may either be used to take a Global Challenge Pathway, a language module or an optional module.

Level 5

Compulsory modules	Module Code	Credits	Period
Probability	MAT-20023	15	Semester 1
Exploring Algebra and Analysis	MAT-20035	15	Semester 1
Differential Equations	MAT-20041	15	Semester 1
Computational Mathematics with Python	MAT-20051	15	Semester 1
Abstract Algebra	MAT-20025	15	Semester 2
Professional Mathematics and Data Analysis	MAT-20043	15	Semester 2
Complex Variable I and Vector Calculus	MAT-20047	15	Semester 2

Optional modules	Module Code	Credits	Period
Flexible Work Placement (Level 5)	NAT-20011	15	Semester 1-2
Dynamics	MAT-20005	15	Semester 2
Real Analysis	MAT-20049	15	Semester 2

Level 5 Module Rules

At Level 5, students take 105 credits of compulsory modules. The remaining 15 credits may either be used to take a Global Challenge Pathway, a language module or an optional module.

Please note: You cannot take both Flexible Work Placement (Level 5) and Flexible Work Placement (Level 6)

Level 6

Compulsory modules	Module Code	Credits	Period
Partial Differential Equations	MAT-30003	15	Semester 1

Optional modules	Module Code	Credits	Period
Non-linear Differential Equations	MAT-30002	15	Semester 1
Group Theory	MAT-30013	15	Semester 1
Number Theory and Cryptography	MAT-30038	15	Semester 1
Financial Mathematics	MAT-30039	15	Semester 1
Structured Investigations in Mathematics (Semester 1)	MAT-30059	15	Semester 1
Project (30 credits)	MAT-30043	30	Semester 1-2
Flexible Work Placement (Level 6)	NAT-30008	15	Semester 1-2
Professional Experience in Education	NAT-30012	15	Semester 1-2
Fluid Mechanics	MAT-30004	15	Semester 2
Waves	MAT-30011	15	Semester 2
Medical Statistics	MAT-30014	15	Semester 2
Mathematical Modelling	MAT-30051	15	Semester 2
Structured Investigations in Mathematics (Semester 2)	MAT-30061	15	Semester 2

Level 6 Module Rules

All Level 6 students will take 15 compulsory credits. Students also need to take at least 15 and at most 30 credits from the "investigatory" module strand MAT-30059, MAT-30061, MAT-30043, contributing to development of research-related and professional skills.

Please note: You cannot take both Flexible Work Placement (Level 5) and Flexible Work Placement (Level 6). You also cannot take both Flexible Work Placement (Level 6) and Professional Experience in Education.

Level 7

Compulsory modules	Module Code	Credits	Period
Masters Project	MAT-40003	60	Semester 1-2

Optional modules	Module Code	Credits	Period
Hydrodynamic Stability Theory	MAT-40019	30	Semester 1-2
Continuum Mechanics	MAT-40021	30	Semester 1-2
Perturbation Methods	MAT-40023	30	Semester 1-2
Field and Galois Theory	MAT-40025	30	Semester 1-2
Topics in Group Theory	MAT-40027	30	Semester 1-2

Learning Outcomes

The table below sets out what students learn in the programme and the modules in which that learning takes place. Details of how learning outcomes are assessed through these modules can be found in module specifications.

Level 4

Subject Knowledge and Understanding	
Learning Outcome	Module in which this is delivered
mathematical methods and techniques in calculus, algebra, and ordinary differential equations	Limits, Series and Calculus; Sets, Functions and Proofs; Linear Algebra; Differential Equations and Multivariable Calculus
the use of mathematical notation	All Level 4 modules
the role of logical mathematical argument and deductive reasoning, including the formal process of mathematical proof	Sets, Functions and Proofs; Linear Algebra
using a structured mathematical or analytical approach to problem solving	All Level 4 modules
the science of data investigation and data visualisation and the applications of statistics	Statistics with Applications in R
probability-based models, hypothesis testing, statistical inference and likelihood;	Statistics with Applications in R
the power of generalisation and abstraction	Sets, Functions and Proofs; Linear Algebra
the application of mathematical modelling techniques to the solution of real-world problems	Mathematical Communication, Investigations and Problem Solving
mathematical word processing packages and symbolic manipulation packages	Mathematical Communication, Investigations and Problem Solving
the use of a specialist statistical computing package	Statistics with Applications in R

Subject Specific Skills	
Learning Outcome	Module in which this is delivered
demonstrate knowledge of key mathematical and statistical concepts, both explicitly and by applying them to the solution of problems	All Level 4 modules
comprehend problems, abstract their essentials, and formulate them in symbolic form so as to facilitate their analysis and solution, and understand how mathematical and statistical processes may be applied to them	All Level 4 modules
select and apply appropriate mathematical and statistical techniques	All Level 4 modules
use models to analyse an underlying problem and to interpret the results of this analysis	Mathematical Communication, Investigations and Problem Solving
understand the importance of assumptions made in mathematical and statistical models, be aware of when and where they are used and possible consequences of their violation	Mathematical Communication, Investigations and Problem Solving
construct and develop logical mathematical arguments with clear identification of assumptions and conclusions	All Level 4 modules
reason critically, carefully and logically and derive (prove) mathematical results	All Level 4 modules
persist with a problem until its successful conclusion	All Level 4 modules
make critical interpretation of data and text	All Level 4 modules
abstract and synthesise information	All Level 4 modules
demonstrate facility with mathematical abstraction	Sets, Functions and Proofs; Linear Algebra;
demonstrate skills relating particularly to the design and conduct of experimental and observational studies and the analysis of data resulting from them	Mathematical Communication, Investigations and Problem Solving; Statistics with Applications in R
formulate and test hypotheses	Mathematical Communication, Investigations and Problem Solving; Statistics with Applications in R
use an advanced statistical package in optional modules	Statistics with Applications in R
use mathematics typesetting software such as LaTeX or Word	Mathematical Communication, Investigations and Problem Solving
take responsibility for their own learning and reflect upon that learning	Mathematical Communication, Investigations and Problem Solving

Key or Transferable Skills (graduate attributes)	
Learning Outcome	Module in which this is delivered
develop and sustain effective approaches to learning and study, including time management, organisational skills, flexibility, creativity and intellectual integrity	All Level 4 modules
acquire, analyse, synthesise, summarise and present information and ideas from a range of sources	All Level 4 modules
work effectively with information technology	All Level 4 modules
communicate effectively and coherently by written and spoken means using appropriate techniques	All Level 4 modules
transfer knowledge from one context to another, and to approach problems analytically and to assess them logically	All Level 4 modules
work comfortably with numerate concepts and arguments in all stages of work	All Level 4 modules
work independently or with others to achieve an objective	All Level 4 modules
motivate themselves and sustain that motivation over an extended period of time	All Level 4 modules

Level 5

Subject Knowledge and Understanding	
Learning Outcome	Module in which this is delivered
appropriate mathematical methods and techniques in the areas of differential equations, vector calculus, complex variable, abstract algebra, and probability	Linear Differential Equations; Probability; Complex Variable and Vector Calculus; Abstract Algebra
the use of mathematical notation	All Level 5 modules
the role of logical mathematical argument and deductive reasoning, including the formal process of mathematical proof	Abstract Algebra; Real Analysis; Complex Variable and Vector Calculus; Exploring Algebra and Analysis
the science of data investigation and data visualisation and the applications of statistics	All Level 5 modules
probability-based models, hypothesis testing, statistical inference and likelihood	Probability; Professional Mathematics and Data Analysis
probability-based models, hypothesis testing, statistical inference and likelihood, the applications of statistics	Probability
the power of generalisation and abstraction	Abstract Algebra; Exploring Algebra and Analysis
the application of mathematical modelling techniques to the solution of real-world problems;	Dynamics
mathematical word processing packages and symbolic manipulation packages	Computational Mathematics with Python; Professional Mathematics and Data Analysis

Subject Specific Skills	
Learning Outcome	Module in which this is delivered
demonstrate knowledge of key mathematical and statistical concepts, both explicitly and by applying them to the solution of problems	All Level 5 modules
comprehend problems, abstract their essentials, and formulate them in symbolic form so as to facilitate their analysis and solution, and understand how mathematical and statistical processes may be applied to them	All Level 5 modules
select and apply appropriate mathematical and statistical techniques	All Level 5 modules
use models to analyse an underlying problem and to interpret the results of this analysis	Differential Equations; Dynamics
understand the importance of assumptions made in mathematical and statistical models, be aware of when and where they are used and possible consequences of their violation	Differential Equations; Dynamics; Professional Mathematics and Data Analysis
construct and develop logical mathematical arguments with clear identification of assumptions and conclusions	All Level 5 modules
reason critically, carefully and logically and derive (prove) mathematical results	All Level 5 modules
persist with a problem until its successful conclusion	All Level 5 modules
make critical interpretation of data and text	All Level 5 modules
abstract and synthesise information	All Level 5 modules
demonstrate facility with mathematical abstraction	Exploring Algebra and Analysis; Abstract Algebra
demonstrate skills relating particularly to the design and conduct of experimental and observational studies and the analysis of data resulting from them	Professional Mathematics and Data Analysis
formulate and test hypotheses	Probability
use an advanced symbolic manipulation package	Computational Mathematics with Python; Professional Mathematics and Data Analysis
use mathematics typesetting software such as LaTeX or Word	Professional Mathematics and Data Analysis
take responsibility for their own learning and reflect upon that learning	Professional Mathematics and Data Analysis

Key or Transferable Skills (graduate attributes)	
Learning Outcome	Module in which this is delivered
develop and sustain effective approaches to learning and study, including time management, organisational skills, flexibility, creativity and intellectual integrity	All Level 5 modules
acquire, analyse, synthesise, summarise and present information and ideas from a range of sources	All Level 5 modules
work effectively with information technology	All Level 5 modules
communicate effectively and coherently by written and spoken means using appropriate techniques	All Level 5 modules
transfer knowledge from one context to another, and to approach problems analytically and to assess them logically	All Level 5 modules
work comfortably with numerate concepts and arguments in all stages of work	All Level 5 modules
work independently or with others to achieve an objective	All Level 5 modules
motivate themselves and sustain that motivation over an extended period of time	All Level 5 modules

Level 6

The table below sets out what students learn in each year of the Programme, the modules in which that learning takes place, and the main ways in which students are assessed on their learning. In Year 1 (Level 4) and Year 2 (Level 5) these learning outcomes are achieved in the compulsory modules which all students are required to take. Some of these outcomes may also be achieved or reinforced in elective modules together with other outcomes not stated here. In Year 3 (Level 6) the stated outcomes are achieved by taking any of the modules offered in each semester.

Subject Knowledge and Understanding	
Learning Outcome	Module in which this is delivered
mathematical methods and techniques in differential equations	Nonlinear Differential Equations; Partial Differential Equations
the use of mathematical notation	All Level 6 modules
the role of logical mathematical argument and deductive reasoning, including the formal process of mathematical proof	Group Theory; Number Theory and Cryptography; Advanced Complex Variable; Structured Investigations in Mathematics
using a structured mathematical or analytical approach to problem solving	All Level 6 modules
the science of data investigation and data visualisation and the applications of statistics	Financial Mathematics; Medical Statistics; Project
probability-based models, hypothesis testing, statistical inference and likelihood	Medical Statistics
the power of generalisation and abstraction	Group Theory; Number Theory and Cryptography
the application of mathematical modelling techniques to the solution of real-world problems;	Fluid Mechanics; Waves; Mathematical Modelling, Project
mathematical word processing packages and symbolic manipulation packages	Financial Mathematics; Medical Statistics; Structured Investigations in Mathematics; Project
the use of a specialist statistical computing package	Medical Statistics; Project
more specialised areas of mathematics and statistics	Level 6 optional modules

Subject Specific Skills	
Learning Outcome	Module in which this is delivered
demonstrate knowledge of key mathematical and statistical concepts, both explicitly and by applying them to the solution of problems	All Level 6 modules
comprehend problems, abstract their essentials, and formulate them in symbolic form so as to facilitate their analysis and solution, and understand how mathematical and statistical processes may be applied to them	All Level 6 modules
select and apply appropriate mathematical and statistical techniques	All Level 6 modules
use models to analyse an underlying problem and to interpret the results of this analysis	Financial Mathematics; Mathematical Modelling; Fluid Mechanics; Waves; Project
understand the importance of assumptions made in mathematical and statistical models, be aware of when and where they are used and possible consequences of their violation	Financial Mathematics; Mathematical Modelling; Fluid Mechanics; Waves; Project
construct and develop logical mathematical arguments with clear identification of assumptions and conclusions	All Level 6 modules
reason critically, carefully and logically and derive (prove) mathematical results	All Level 6 modules
persist with a problem until its successful conclusion	All Level 6 modules
make critical interpretation of data and text	All Level 6 modules
abstract and synthesise information	All Level 6 modules
demonstrate facility with mathematical abstraction	Group Theory; Number Theory and Cryptography; Structured Investigations in Mathematics; Project
demonstrate skills relating particularly to the design and conduct of experimental and observational studies and the analysis of data resulting from them	Financial Mathematics; Medical Statistics; Mathematical Modelling
formulate and test hypotheses	Financial Mathematics; Medical Statistics; Mathematical Modelling; Project
use an advanced symbolic manipulation package	Structured Investigations in Mathematics; Project
use an advanced statistical package in optional modules	Financial Mathematics; Medical Statistics; Project
use mathematics typesetting software such as LaTeX or Word	Mathematical Modelling; Structured Investigations in Mathematics; Project
take responsibility for their own learning and reflect upon that learning	Mathematical Modelling; Structured Investigations in Mathematics; Project

Key or Transferable Skills (graduate attributes)	
Learning Outcome	Module in which this is delivered
develop and sustain effective approaches to learning and study, including time management, organisational skills, flexibility, creativity and intellectual integrity	All Level 6 modules
acquire, analyse, synthesise, summarise and present information and ideas from a range of sources	All Level 6 modules
work effectively with information technology	All Level 6 modules
communicate effectively and coherently by written and spoken means using appropriate techniques	All Level 6 modules
transfer knowledge from one context to another, and to approach problems analytically and to assess them logically	All Level 6 modules
work comfortably with numerate concepts and arguments in all stages of work	All Level 6 modules
work independently or with others to achieve an objective	All Level 6 modules
motivate themselves and sustain that motivation over an extended period of time	All Level 6 modules
be adaptable, in particular display a readiness to address new problems from new areas	All Level 6 modules

Level 7

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 (levels 4 and 5) these learning outcomes are achieved mainly in the compulsory modules which all students are required to take. Some of the outcomes are also achieved in the optional core modules. In the third year (level 6) the stated outcomes are achieved by the student taking a selection of eight optional modules. In the fourth year (level 7) 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.

Subject Knowledge and Understanding	
Learning Outcome	Module in which this is delivered
mathematical methods and techniques in calculus, algebra, and ordinary differential equations	All Level 7 modules
the use of mathematical notation	All Level 7 modules
the role of logical mathematical argument and deductive reasoning, including the formal process of mathematical proof	Field and Galois Theory; Topics in Group Theory; Masters Project
using a structured mathematical or analytical approach to problem solving	All Level 7 modules
the science of data investigation and data visualisation, and the applications of statistics	Masters Project
probability-based models, hypothesis testing, statistical inference and likelihood	Masters Project
the power of generalisation and abstraction	All Level 7 modules
the application of mathematical modelling techniques to the solution of real-world problems	Hydrodynamic Stability Theory; Continuum Mechanics; Project
mathematical word processing packages and symbolic manipulation packages	Masters Project
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 achievement at the Bachelor's level.	All Level 7 modules
apply knowledge and problem-solving abilities in new or unfamiliar environments and within broader contexts	All Level 7 modules
integrate knowledge and handle complexity, and formulate judgements with incomplete or limited information	All Level 7 modules
communicate conclusions and the knowledge and rationale underpinning these, to specialist and non specialist audiences, clearly and unambiguously	Masters Project
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

Subject Specific Skills	
Learning Outcome	Module in which this is delivered
demonstrate knowledge of key mathematical and statistical concepts, both explicitly and by applying them to the solution of mathematical problems	All Level 7 modules
comprehend problems, abstract their essentials, and formulate them in symbolic form so as to facilitate their analysis and solution, and understand how mathematical and statistical processes may be applied to them	All Level 7 modules
select and apply appropriate mathematical and statistical techniques	All Level 7 modules
use models to analyse an underlying problem and to interpret the results of this analysis	Hydrodynamic Stability Theory; Continuum Mechanics; Masters Project
understand the importance of assumptions made in mathematical and statistical models, be aware of when and where they are used and possible consequences of their violation	All Level 7 modules
construct and develop logical mathematical arguments with clear identification of assumptions and conclusions	All Level 7 modules
reason critically, carefully and logically and derive (prove) mathematical results	All Level 7 modules
persist with a problem until its successful conclusion	All Level 7 modules
make critical interpretation of data and text	All Level 7 modules
abstract and synthesise information	All Level 7 modules
demonstrate facility with mathematical abstraction	Field and Galois Theory; Topics in Group Theory; Masters Project
demonstrate skills designing observational studies, analysing data resulting from them, and formulating and testing hypotheses	Masters Project
use an advanced symbolic manipulation package, statistical packages and mathematics typesetting software	Masters Project
research and write up a topic in the style of an academic journal article	Masters Project

Key or Transferable Skills (graduate attributes)	
Learning Outcome	Module in which this is delivered
develop and sustain effective approaches to learning and study, including time management, organisational skills, flexibility, creativity and intellectual integrity	All Level 7 modules
acquire, analyse, synthesise, summarise and present information and ideas from a range of sources	All Level 7 modules
work effectively with information technology	All Level 7 modules
communicate effectively and coherently by written and spoken means using appropriate techniques	All Level 7 modules
transfer knowledge from one context to another, and to approach problems analytically and to assess them logically	All Level 7 modules
work comfortably with numerate concepts and arguments in all stages of work	All Level 7 modules
work independently or with others to achieve an objective	All Level 7 modules
motivate themselves and sustain that motivation over an extended period of time	All Level 7 modules
be adaptable, in particular display a readiness to address new problems from new areas	All Level 7 modules

9. Final and intermediate awards

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

Master in Mathematics Degree	480 credits	<p>You will require at least 120 credits at levels 4, 5, 6 and 7</p> <p>You must accumulate at least 435 credits in Mathematics (out of 480 credits overall), with at least 105 credits in each of Years 1, 2 and 3 (Levels 4, 5 and 6) and 120 in Year 4 (Level 7) in Mathematics modules.</p> <p>NB: students transferring to the MMath programme from the Mathematics combined honours programme will require only 390 credits in Mathematics modules, with at least 105 credits in each of Years 2 and 3 (Levels 5 and 6) and 120 in Year 4 (Level 7) in Mathematics modules.</p>
Honours Degree	360 credits	You will require at least 120 credits at levels 4, 5 and 6, with at least 105 credits in each of Years 1, 2 and 3 (Levels 4, 5 and 6) in Mathematics modules.
Diploma in Higher Education	240 credits	You will require at least 120 credits at level 4 or higher and at least 120 credits at level 5 or higher
Certificate in Higher Education	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 Master in Mathematics programme.

Master in Mathematics with Work Placement Year: in addition to the above students must pass 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 four-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 on this programme 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 on your programme:

- **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. Many taught modules in Levels 4 to 6 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. Many 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.

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

	Scheduled learning and teaching activities	Guided independent Study	Placements
Year 1 (Level 4)	32.4%	67.6%	0%
Year 2 (Level 5)	37.6%	62.4%	0%
Year 3 (Level 6)	20.2%	76.8%	3%
Year 4 (Level 7)	14.3%	85.7%	0%

12. Accreditation

All three programmes are accredited by the Institute of Mathematics and its Applications (IMA).

13. University 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/>

If this programme has any exemptions, variations or additions to the University Regulations these will be detailed in an Annex at the end of this document titled 'Programme-specific regulations'.

14. What are the typical admission requirements for the Programme?

See the relevant course page on the website for the admission requirements relevant to this programme:

<https://www.keele.ac.uk/study/>

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.

English for Academic Purposes

Please note: All new international students entering the university will provide a sample of Academic English during their registration. Using this sample, the Language Centre may allocate you to an English language module which will become compulsory. This will replace any GCP modules. *NB:* students can take an EAP module only with the approval of the English Language Programme Director and are not able to take any other Language modules in the same academic year.

English Language Modules at Level 4:

- Business - ENL-90003 Academic English for Business Students (Part 1); ENL-90004 Academic English for Business Students (2)
- Science - ENL-90013 Academic English for Science Students
- General - ENL-90006 English for Academic Purposes 2; ENL-90001 English for Academic Purposes 3; ENL-90002 English for Academic Purposes 4

English Language Modules at Level 5:

- Business - ENL-90003 Academic English for Business Students (Part 1); ENL-90004 Academic English for Business Students (2)
- Science - ENL-90013 Academic English for Science Students
- General - ENL-90006 English for Academic Purposes 2; ENL-90001 English for Academic Purposes 3; ENL-90002 English for Academic Purposes 4

English Language Modules at Level 6:

- Business - ENL-90003 Academic English for Business Students (Part 1); ENL-90004 Academic English for Business Students (2); ENL-90005 Advanced Business English Communication
- Science - ENL-90013 Academic English for Science Students
- General - ENL-90006 English for Academic Purposes 2; ENL-90001 English for Academic Purposes 3; ENL-90002 English for Academic Purposes 4

Recognition of Prior Learning (RPL) 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: <https://www.keele.ac.uk/qa/programmesandmodules/recognitionofpriorlearning/>

15. How are students supported on the programme?

Support for student learning on the Programme is provided in the following ways:

- Module lecturers and Examples Class tutors are responsible for providing support for learning on the modules. They also give individual feedback on coursework assignments and more general feedback on examinations. The Mathematics Division has an Open Door policy so that lecturers and tutors are happy to see and advise students at any reasonable time, or by a mutually convenient appointment.
- Every student is allocated to an Academic Mentor who is responsible for reviewing and advising on students' academic progress in Mathematics and on their other Principal Programme.
- Academic Mentors also act as a first point of contact for students on non-academic issues which may affect their learning and can refer students on to a range of specialist health, welfare and financial services co-ordinated by the University's Student Services.

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 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 in the Annex for the International Year.

Work Placement Year

Students have the opportunity to apply directly for the 4-year 'with Work Placement Year' degree programme or to transfer onto the 4-year degree programme at the end of Year-1 and in Year-2 at the end of Semester 1. Students who are initially registered for the 4-year degree programme may transfer onto the 3-year degree programme at any point in time, prior to undertaking their year-long placement. Eligibility rules are included in the Annex.

Students wishing to take the work placement year should meet with the Programme Director to obtain their signature to confirm agreement before they will be allowed to commence their placement.

International students who require a Tier 4 visa must check with the Immigration Compliance Team prior to commencing any form of placement.

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

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 costs for this programme

19. Quality management and enhancement

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

- The School Education Committee is responsible for reviewing and monitoring quality management and enhancement procedures and activities across the School.
- Individual modules and the 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.
- The programmes are run in accordance with the University's Quality Assurance procedures and are subject to periodic reviews under the Revalidation process.

Student evaluation of, and feedback on, the quality of learning on every 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 annual programme review.
- Findings related to the programme 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 three years of the programme is considered and acted on at regular meetings of the 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/ga/externalexaminers/currentexternalexaminers/>

20. The principles of programme design

The programme described in this document has 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/quality-code>

b. QAA Subject Benchmark Statement: Mathematics, Statistics and Operational Research (2023)

<https://www.qaa.ac.uk/the-quality-code/subject-benchmark-statements/subject-benchmark-statement->

21. Annex - International Year

Master in Mathematics with International Year

<p>International Year Programme</p> <p>Students registered for Master in Mathematics may either be admitted for or apply to transfer during their period of study at Level 5 to the 'Master in Mathematics with International Year'. Students accepted onto this programme will have an extra year of study (the International Year) at an international partner institution after they have completed Year 2 (Level 5) at Keele.</p> <p>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 Master in Mathematics course and progress to Level 6 on that basis. The failure will be recorded on the student's final transcript.</p> <p>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 'Master in Mathematics with International Year'.</p>
<p>International Year Programme Aims</p> <p>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:</p> <ol style="list-style-type: none">1. Personal development as a student and a researcher with an appreciation of the international dimension of their subject2. Experience of a different culture, academically, professionally and socially
<p>Entry Requirements for the International Year</p> <p>Students may apply to the 5-year programme during Level 5. Admission to the International Year is subject to successful application, interview and references from appropriate staff.</p> <p>The criteria to be applied are:</p> <ul style="list-style-type: none">• Academic Performance (an average of 55% across all modules in Semester 1 at Level 5 is normally required. Places on the International Year are then conditional on achieving an average mark of 55% across all Level 5 modules. Students with up to 15 credits of re-assessment who meet the 55% requirement may progress to the International Year. Where no Semester 1 marks have been awarded performance in 1st year marks and ongoing 2nd year assessments are taken into account)• General Aptitude (to be demonstrated by application for study abroad, interview during the 2nd semester of year 2 (Level 5), and by recommendation of the student's Academic Mentor, 1st and 2nd year tutors and programme director) <p>Any failed Level 5 modules without good cause will result in the student being prohibited from transferring to the 5-year Master in Mathematics with International Year programme.</p> <p>Students may not register for both an International Year and a Placement Year.</p>
<p>Student Support</p> <p>Students will be supported whilst on the International Year via the following methods:</p> <ul style="list-style-type: none">• Phone or Skype conversations with Study Abroad tutor, in line with recommended Academic Mentoring meeting points.• Support from the University's Global Education Team
<p>Learning Outcomes</p>

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:

1. describe, discuss and reflect upon the cultural and international differences and similarities of different learning environments;
2. discuss the benefits and challenges of global citizenship and internationalisation;
3. explain how their perspective on their academic discipline has been influenced by locating it within an international setting;
4. communicate effectively in an international setting;
5. reflect on previous learning within an international context.

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.

Regulations

Students registered for the International Year are subject to the programme-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 two thirds* mathematics topics.

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 module with significant overlap to the Level 6 modules they will study 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

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 who meet external eligibility criteria 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.

22. Annex - Work Placement Year

Master in Mathematics with Work Placement Year

Work Placement Year summary

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 Work Placement Year aims to provide students with:

1. substantial experience of work with a relevant placement provider, including familiarisation with the professional working environment;
2. an opportunity to apply academic theory learned as part of their taught degree to real situations in the work place, and to expand their employability skills.

Entry Requirements for the Work Placement 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, (* or equivalent, work placement), will automatically transfer onto the 4-year degree programme.

* We recommend where possible students undertake a placement of between 9 - 12 months on a full-time basis to maximize academic and personal growth. However, the Faculty of Natural Sciences Work / Professional Placement Year mandates a minimum of 24 weeks in duration, ideally on a full-time basis, but no less than 21 hours per week. This enables those undertaking an unpaid placement to work on a part-time basis alongside their placement.

The criteria to be applied are:

- A good University attendance record and be in 'good academic standing'.
- Academic Performance (an average of 50% across all modules in Semester 1 at Level 5 is normally required. Places on the Work Placement Year are then conditional on achieving an average mark of 50% across all Level 5 modules. Students with up to 15 credits of re-assessment who meet the 50% requirement may progress to the Work Placement Year. Where no Semester 1 marks have been awarded performance in 1st year marks and ongoing 2nd year assessments are taken into account)
- 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 2nd semester of Year 2 (Level 5), and by recommendation of the student's Academic Mentor and as necessary, other staff members).
- Students undertaking work placements will be expected to complete a Health and Safety checklist prior to commencing their work experience and will be required to satisfy the Health and Safety regulations of the company or organisation at which they are based.
- 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.
- (*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 5-year with Work Placement Year degree programme. Students wishing to transfer onto this programme should discuss this with student support, the academic tutor for the work placement year, and the Programme Lead. 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.

Students may not register for both an International Year and a Work Placement Year.

Student Support

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

- Regular contact between the student and a named member of staff 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.
- Two formal contacts with the student during the placement year: the University supervisor will visit the student in their placement organisation at around the 5 weeks after placement has commenced, and then visit again (or conduct a telephone/video call tutorial) at around 15 weeks into the placement.
- Weekly supervision sessions will take place with the placement supervisor (or his/her 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 the 'with Work Placement Year' option will be able to:

1. evaluate their own employability skills (via a SWOT analysis);
2. create Intended Learning Outcomes for their placement in order to develop the skills areas which they have identified as needing further enhancement;
3. develop, through practice in the work place, the work-related skills identified through their SWOT analysis and Intended Learning Outcomes;
4. apply academic theory learned as part of their taught degree to real situations in the work place;
5. reflect on their work placement activities and evaluate their impact on their own employability skills;
6. 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 (NAT-30010) which involves:

1. 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;
2. 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;
3. 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;

Regulations

Students registered for the 'with Work Placement Year' option are subject to programme-specific regulations (if any) and the University regulations. In addition, during the Work Placement Year, the following regulations will apply:

1. Students undertaking the Work Placement Year must successfully complete the zero-credit rated 'Work Placement Year' module (NAT-30010)
2. 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.
3. Students failing Assessment 1 at first attempt will be required to withdraw from the Work Placement Year module and will be transferred onto the 3-year degree programme.
4. 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:

(i) conforming to the work practices of the organisation; and

(ii) remembering that they are representatives of the University and their actions will reflect on the School and have an impact on that organisation's willingness (or otherwise) to remain engaged with the placement.

Additional costs for the Work Placement Year

Tuition fees for students on the Work 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

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.

A small stipend may be available to students from the placement provider during the placement but this will need to be explored on a placement-by-placement basis as some organisations, such as charities, may not have any extra money available. Students should budget with the assumption that their placement will be unpaid.

Eligibility for student finance will depend on the type of placement and whether it is paid or not. If it is paid, this is likely to affect student finance eligibility, however if it is voluntary and therefore unpaid, should not affect student finance eligibility. Students are required to confirm eligibility with their student finance provider.

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.

23. Annex - Programme-specific regulations

Programme Regulations: Mathematics

Final Award and Award Titles	Master in Mathematics (MMath) Master in Mathematics with International Year Master in Mathematics with Work Placement Year
Intermediate Award(s)	BSc (Hons) Mathematics Diploma in Higher Education Certificate in Higher Education
Last modified	December 2022
Programme Specification	https://www.keele.ac.uk/qa/programmespecifications

The University's Academic Regulations which can be found on the Keele University website (<https://www.keele.ac.uk/regulations/>)[1] apply to and regulate the programme, other than in instances where the specific programme regulations listed below over-ride them. These programme regulations list:

- *Exemptions* which are characterised by the omission of the relevant regulation.
- *Variations* which are characterised by the replacement of part of the regulation with alternative wording.
- *Additional Requirements* which set out what additional rules that apply to students in relation to this programme.

The following **exemptions**, **variations** and **additional requirements** to the University regulations have been checked by Academic Services and have been approved by the Faculty Education Committee.

A) EXEMPTIONS

The clause(s) listed below describe where an exemption from the University's Academic Regulations exists:

For the whole duration of their studies, students on this Programme are exempt from the following regulations:

- **No exemptions apply.**

B) VARIATIONS

The clause(s) listed below describe where a variation from the University's Academic Regulations exists:

Variation 1: Transfer onto the MMath programme (Regulation C6)

(a) Single Honours BSc Mathematics students will be permitted to transfer onto the MMath Programme at any point up to the end the first semester of Level 6, subject to having met any relevant progression criteria and, in any event, only with the approval of the Programme Director. Combined 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.

(b) 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 UK Home Office Visa (UKVI) restrictions, students who enrol on an integrated master's programme are not able to transfer to an alternative programme without the change meeting UKVI requirements. Where students wish to take an exit award of a Bachelor's Degree at the level 6 boards they are able to do so, but it is recommended to speak with Immigration Compliance and Support (visa@keele.ac.uk) before taking this option as this affects current and future Visa options.

All other students who are considering a course change or find themselves in circumstances where they need to change will need to speak to Immigration Compliance and Support (Student Services Centre) (visa@keele.ac.uk) first to check eligibility and review the consequences of the transfer and the timings of a new Visa application from outside the UK.

Variation 2: Progression

The rules governing progression from one level of study to the next are governed by the University's Regulation C6 (Section 10). This regulation can be found at the following web address: <https://www.keele.ac.uk/regulations/regulationc6/>

Variation 3: Degree Award

(a) The algorithm for the award of a given degree classification can be found at the following web address: <https://www.keele.ac.uk/qa/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 C6 and can also be found at the above web address.

(c) In addition to module condonement, Mathematics also applies module compensation at Levels 5 and 6. 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/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 C6, or 6.2(c) above, shall be awarded a Single Honours Mathematics BSc degree.

[1] References to University Regulations in this document apply to the content of the University's Regulatory Framework as set out on the University website here <https://www.keele.ac.uk/regulations/>.

Version History

This document

Date Approved: 26 March 2025

Previous documents

Version No	Year	Owner	Date Approved	Summary of and rationale for changes
1.1	2024/25	DANILA PRIKAZCHIKOV	14 March 2025	Faculty placement modules added, also MAT-30003 changed from optional to compulsory and MAT-30057 replaced by NAT-30012
1	2024/25	DANILA PRIKAZCHIKOV	14 June 2024	
1	2023/24	DANILA PRIKAZCHIKOV	19 January 2023	
1.1	2022/23	DANILA PRIKAZCHIKOV	22 December 2022	Change to progression threshold from Level 5 to Level 6: reduced to 50% (agreed by Senate in December 2022)
1	2022/23	PAUL TRUMAN	13 May 2022	
1.1	2021/22	PAUL TRUMAN	24 March 2021	Added MAT-30051 Mathematical Modelling as a Level 6 optional module.
1	2021/22	PAUL TRUMAN	08 February 2021	
2.2	2020/21	PAUL TRUMAN	24 March 2021	Added MAT-30051 Mathematical Modelling as a Level 6 optional module.
2.1	2020/21	PAUL TRUMAN	08 February 2021	Changes to Level 6 optional modules: MAT-30001 Graph Theory moved from semester 2 to semester 1. MAT-30047 Introduction to linear elasticity added.
2	2020/21	PAUL TRUMAN	08 December 2020	Minor update to Programme Specific Regulations (Variation 1): deadline for transfer from the SH programme to the MMath changed from the end of level 5 to the end of the first semester of level 6.
1	2020/21	PAUL TRUMAN	19 December 2019	
3.2	2019/20	PAUL TRUMAN	24 March 2021	Added MAT-30051 Mathematical Modelling as a Level 6 optional module.
3.1	2019/20	PAUL TRUMAN	08 February 2021	Changes to Level 6 optional modules: MAT-30001 Graph Theory moved from semester 2 to semester 1. MAT-30047 Introduction to linear elasticity added. MAT-30033 Applied Time Series Removed
3	2019/20	PAUL TRUMAN	08 December 2020	Minor update to Programme Specific Regulations (Variation 1): deadline for transfer from the SH programme to the MMath changed from the end of level 5 to the end of the first semester of level 6.

Version No	Year	Owner	Date Approved	Summary of and rationale for changes
2	2019/20	SARAH ROBERTS	02 June 2020	Changes to modules with 'Mathematical Modelling' removed as a compulsory module and 'Professional Mathematics and Data Science' added as an optional module at Level 5, and optional module changes at Levels 6 and 7.
1	2019/20	PAUL TRUMAN	19 December 2019	