**Programme Specification**

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| **Please note:** This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she passes the programme. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in the programme handbook. The accuracy of the information contained in this specification is reviewed by the University and may be checked by the Quality Assurance Agency for Higher Education. |

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| **MMath Mathematics** |

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| 1. **Awarding Institution/Body**
 | University of Kent |
| 1. **Teaching Institution**
 | University of Kent  |
| 1. **School responsible for management of the programme**
 | School of Mathematics, Statistics and Actuarial Science |
| 1. **Teaching Site**
 | Canterbury |
| 1. **Mode of Delivery**
 | Full-time |
| 1. **Programme accredited by**
 | Institute of Mathematics and Its Applications |
| 1. **a) Final Award**
 | MMath  |
| 7. **b) Alternative Exit Awards**  | BSc (hons) MathematicsBSc (non hons) Mathematics; Diploma in Mathematics; Certificate in Mathematics |
| 1. **Programme**
 | Mathematics |
| 1. **UCAS Code (or other code)**
 | G103 |
| 1. **Credits/ECTS Value**
 | 480 credits (ECTS 240) |
| 1. **Study Level**
 | Undergraduate |
| 1. **Relevant QAA subject benchmarking group(s)**
 | Mathematics, Statistics and Operational Research (2015) |
| 1. **Date of creation/revision**
 | Aug 2016/revised FSO Dec 2017  |
| 1. **Intended Start Date of Delivery of this Programme**
 | September 2018 |

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| 1. **Educational Aims of the Programme**

The programme aims to: |
| * Provide an excellent quality of mathematical education, informed by research and scholarship
* Equip students with a broad base of knowledge and skills to analyse and solve mathematically based problems showing a level of originality where necessary
* Ensure students are competent in communicating the knowledge, rationale and conclusions, both orally and in writing
* Ensure students are competent in the use of information technology and can use appropriate software to solve problems
* Develop in students the ability to work independently with a minimum amount of supervision within agreed guidelines
* Prepare successful students with the depth of mathematical knowledge to enter postgraduate studies at the doctorate level in mathematics and other closely related subjects
* Produce graduates of value to the region and nationally, in possession of key mathematical knowledge and personal skills, with the capacity to learn
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| **16 Programme Outcomes**The programme provides opportunities for students to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in the following areas. The programme outcomes have references to the subject benchmarking statement for Mathematics, Statistics and Operational Research 2015 (SB). |

**A. Knowledge and Understanding of:**

1. The fundamental concepts and techniques of calculus, algebra, analysis, geometry, differential equations, numerical mathematics and probability and inference (SB3.8)
2. Methods and techniques of mathematics, including more advanced material with mathematical ideas from more than one area (SB3.19)
3. Nonlinear phenomena and related mathematical methods (SB3.17)
4. Applications of mathematical theories, methods and techniques to a range of associated problems (SB3.7, SB3.12, SB3.13, SB3.17)
5. The role of logical mathematical argument and deductive reasoning including the formal process of mathematical proof (SB3.12, SB3.13)
6. Project work on an advanced mathematical topic based on substantial independent work

**Skills and Other Attributes**

**B. Intellectual Skills (SB3.21, SB3.22):**

1. Ability to demonstrate a good understanding of the main body of knowledge for Mathematics
2. Ability to demonstrate a very good level of skill in calculation and manipulation of mathematical material and be capable of solving complex problems formulated within it.
3. Ability to apply a range of concepts and principles in various contexts relevant to mathematics
4. Ability to develop and evaluate logical arguments in mathematics
5. Ability to demonstrate skill in solving mathematical problems by various appropriate methods
6. Ability in relevant computer skills and usage
7. Ability to work with relatively little guidance
8. Ability to plan and develop an advanced project in mathematics

**C. Subject-specific Skills(SB3.21) :**

1. Ability to demonstrate knowledge of core and advanced mathematical concepts and topics, both explicitly and by applying them to the solution of problems
2. Ability to comprehend problems, abstract the essentials of problems and formulate them mathematically and in symbolic form so as to facilitate their analysis and solution
3. Ability to use computational and more general IT facilities as an aid to mathematical processes
4. Ability to present mathematical arguments and the conclusions from them with clarity and accuracy

**D. Transferable Skills (SB3.24):**

1. Problem-solving skills, relating to qualitative and quantitative information
2. Communication skills, covering both written and oral communication
3. Numeracy and computational skills
4. Information-retrieval skills, in relation to primary and secondary information sources, including information retrieval through on-line computer searches
5. Information technology skills such as scientific word processing, internet communication, etc.
6. Personal and interpersonal skills, work as a member of a team
7. Time-management and organisational skills, as evidenced by the ability to plan and implement efficient and effective modes of working
8. Study skills needed for continuing professional development

**Teaching/learning and assessment methods and strategies used to enable the programme learning outcomes to be achieved and demonstrated**

Teaching/learning: Lectures given by a wide variety of lecturers with different research backgrounds; example classes; workshops; computer laboratory classes; tutorials; projects; dissertation module; key skills module; group work.

Assessment: Coursework involving problems, computer assignments, project reports, class tests, oral presentation, dissertation; written unseen examinations.

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| For more information on the skills developed by individual modules and on the specific learning outcomes associated with any Certificate, Diploma or BA/BSc non-honours awards relating to this programme of study, see the module mapping table, located at the end of this specification.  |

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| **17 Programme Structures and Requirements, Levels, Modules, Credits and Awards**This programme is studied over four years full-time. The programme is divided into four stages, each stage comprising modules to a total of 120 credits. Students must successfully complete each module in order to be awarded the specified number of credits for that module. One credit corresponds to approximately ten hours of 'learning time' (including all classes and all private study and research). Thus obtaining 120 credits in an academic year requires 1,200 hours of overall learning time. For further information on modules and credits refer to the Credit Framework at <http://www.kent.ac.uk/teaching/qa/credit-framework/creditinfo.html> Each module and programme is designed to be at a specific level. For the descriptors of each of these levels, refer to Annex 2 of the Credit Framework at <http://www.kent.ac.uk/teaching/qa/credit-framework/creditinfoannex2.html>. To be eligible for the award of an honours MMath degree students must obtain 480 credits, at least 330 credits at level 5 or above including at least 120 credits at level 7. In addition, and in line with other MMath programmes, there are minimum average mark requirements for progression from Stage 1 to Stage 2, from Stage 2 to Stage 3 and from Stage 3 to Stage 4; these are detailed below.Compulsory modules are core to the programme and must be taken by all students studying the programme. Optional modules provide a choice of subject areas, from which students will select a stated number of modules. Students will be advised to take a balanced programme, not exceeding 75 credits in any one term. Neither condonement nor compensation is allowed for MAST5780. Trailing and retrieving credit is not applicable due to the requirements for progression.Where a student fails a module(s) due to illness or other mitigating circumstances, such failure may be condoned, subject to the requirements of the Credit Framework and provided that the student has achieved the **programme** learning outcomes. For further information refer to the Credit Framework at <http://www.kent.ac.uk/teaching/qa/credit-framework/creditinfo.html>. Where a student fails a module(s), but has marks for such modules within 10 percentage points of the pass mark, the Board of Examiners may nevertheless award the credits for the module(s), subject to the requirements of the Credit Framework and provided that the student has achieved the **programme** learning outcomes. For further information refer to the Credit Framework. Students successfully completing Stage 1 of the MMath programme with an average mark of 60% or over (at the first attempt) and meeting credit framework requirements may progress to Stage 2 of the programme. Students who complete Stage 1 successfully, but with an average mark below 60% (at the first attempt), will be transferred to the 3-year BSc (Hons) Mathematics programme.Students successfully completing Stage 1 of the MMath programme and meeting credit framework requirements who do not successfully complete Stage 2 will be eligible for the award of the Certificate in Mathematics. Students who complete Stage 2 successfully, but with an average mark that year below 60% (at the first attempt) will be transferred to the 3-year BSc (Hons) Mathematics programme. Students who complete Stage 2 of the programme with an average mark in that year of 60% or over (at the first attempt) may progress to stage 3 of the MMath programme. Students successfully completing Stage 1 and Stage 2 of the MMath programme and meeting credit framework requirements but who do not successfully complete Stage 3 will be eligible for the award of the Diploma in Mathematics. Students who complete Stage 3 successfully, but with an average mark in that year below 60% (at the first attempt) can be awarded a BSc (Hons) in Mathematics, provided they have met the requirements of that programme. Students who complete Stage 3 of the programme with an average mark in that year of 60% or over (at the first attempt) may either progress to stage 4 of the MMath programme or be awarded a BSc (Hons) in Mathematics. Students successfully completing Stage 2 of the programme and achieving 300 credits overall including at least 60 credits at level 6 or above in Stage 3 and meeting Credit Framework requirements will be eligible for the award of a BSc non-honours degree. |
| For the purpose of overall classification, the University’s standard weighting of stages for four year undergraduate degree programmes will be used, namely 20% for stage 2, 30% for stage 3 and 50% for stage 4. Candidates not meeting the progression threshold will be classified under the standard Credit Framework requirements for the alternative exit award. For further information refer to the Credit Framework at https://www.kent.ac.uk/teaching/qa/credit-framework/creditinfo.html#exit-awards.This programme matches the programme for the BSc (Hons) in Mathematics at Stages 1 and 2, so direct transfer between the programmes is possible up to the end of Stage 2, subject to the progression requirements of the MMath programme. At Stage 3 the programmes match, with the exception of an optional project module (MAST6704) in the BSc (Hons) programme. For the purposes of transfer between the programmes, module MAST6704 is accepted as an appropriate Stage 3 module for Stage 4 of the MMath programme, in which case Communicating Mathematics is considered to have been studied and need not be taken at Stage 4. |

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| **KV Code** | **Code** | **Title** | **Level** | **Credits** | **Term(s)** |
| **Stage 1** |
| **Compulsory Modules** |
| MAST4006 | MA348 | Mathematical methods 1 | 4 | 15 | 1 |
| MAST4007 | MA349 | Mathematical methods 2 | 4 | 15 | 2 |
| MAST4009 | MA351 | Probability | 4 | 15 | 1 |
| MAST4011 | MA306 | Statistics | 4 | 15 | 2 |
| MAST4010 | MA352 | Real analysis 1 | 4 | 15 | 1 |
| MAST4001 | MA343 | Algebraic methods | 4 | 15 | 1 |
| MAST4004 | MA346 | Linear algebra | 4 | 15 | 2 |
| MAST4002 | MA344 | Applications of mathematics | 4 | 15 | 2 |
| **Stage 2** |
| **Compulsory Modules** |
| MAST5013 | MA5513 | Real analysis 2 | 5 | 15 | 1 |
| MAST5005 | MA5505 | Linear partial differential equations | 5 | 15 | 1 |
| MAST5003 | MA5503 | Groups and symmetries | 5 | 15 | 1 |
| **Optional Modules** Students must select 75 credits from the following |
| MAST5009 | MA5509 | Numerical methods | 5 | 15 | 2 |
| MAST5007 | MA5507 | Mathematical statistics | 5 | 15 | 1 |
| MAST5660 | MA566 | Number theory | 5 | 15 | 1 |
| MAST5012 | MA5512 | Ordinary differential equations | 5 | 15 | 2 |
| MAST5014 | MA5514 | Rings and fields | 5 | 15 | 2 |
| MAST5002 | MA5502 | Curves and surfaces | 5 | 15 | 2 |
| MAST5004 | MA5504 | Lagrangian and Hamiltonian dynamics | 5 | 15 | 2 |
| MAST5001 | MA5501 | Applied statistical modelling 1 | 5 | 15 | 2 |
| **Stage 3** |
| **Optional Modules** Students may select up to 60 credits from the following. Availability of modules on the list will depend on whether appropriate pre-requisite and co-requisite modules have been taken. |
| MAST6360 | MA636 | Stochastic processes | 6 | 15 | 1 |
| MAST6390 | MA639 | Time series modelling and simulation | 6 | 15 | 2 |
| MAST6029 | MA6529 | Statistical learning | 6 | 15 | 2 |
| MAST6028 | MA6528 | Principles of data collection | 6 | 15 | 1 |
| MAST6012 | MA6512 | Applied statistical modelling 2 | 6 | 15 | 2 |
| MAST7710 | MA771  | Computational statistics | 6 | 15 | 2 |
| MAST5380 | MA538 | Applied Bayesian modelling | 6 | 15 | 1 |
| **Optional Modules** Students must select from the following to obtain a total of 120 credits. Availability of modules on the list will depend on whether appropriate pre-requisite and co-requisite modules have been taken and on whether the module is available. Scheduling of particular modules in autumn or spring term where indicated as ‘1 or 2’ will ensure a reasonable balance across terms for those modules that are offered. For further information, refer to the handbook.Only one of each pair of the following modules may be taken at Stages 3 and 4:Linear and non-linear waves, Polynomials in several variables, Topology, Nonlinear systems and applications, Orthogonal polynomials and special functions, Discrete mathematics, Graphs and combinatorics, Groups and representations, Quantum mechanics, Operators and matrices, Symmetry methods for differential equations, Integrable systems, Groups, knots and fields, Fluid dynamics, Mathematics for music, Metric and normed spaces, Asymptotics and perturbation methods, Communicating mathematics.Communicating mathematics must be taken at either Stage 3 or Stage 4. |
| **The modules below will run every year** |
| MAST6017 | MA6517 | Functions of a complex variable | 6 | 15 | 1 |
| MAST5870  | MA587 | Numerical solution of differential equations | 6 | 15 | 1 |
| MAST6018 | MA6518 | Games and strategy | 6 | 15 | 2 |
| MAST6002 | MA691 | Linear and nonlinear waves | 6 | 15 | 1 |
| MAST5740 | MA574 | Polynomials in several variables | 6 | 15 | 1 |
| MAST5670 | MA567 | Topology | 6 | 15 | 1 |
| MAST6703 | MA6503 | Communicating mathematics | 6 | 15 | 1 |
| MAST6091 |  | Mathematics in the World of Finance | 6 | 15 | 1 |
| **One of the two modules below will run each year** |
| MAST6044 | MA6544 | Nonlinear systems and applications | 6 | 15 | 2 |
| MAST5680 | MA568 | Orthogonal polynomials and special functions | 6 | 15 | 2 |
| **One of the two modules below will run each year** |
| MAST5490 | MA549 | Discrete mathematics | 6 | 15 | 2 |
| MAST5950 | MA595 | Graphs and combinatorics | 6 | 15 | 2 |
| **The indicative list of modules below will run to provide a balanced programme with adequate choice.** |
| MAST5760 | MA576 | Groups and representations | 6 | 15 | 1 or 2 |
| MAST6004 | MA607 | Quantum mechanics | 6 | 15 | 1 or 2 |
| MAST6005 | MA692 | Operators and matrices | 6 | 15 | 1 or 2 |
| MAST6001 | MA690 | Symmetry methods for differential equations | 6 | 15 | 1 |
| MAST6022 | MA6522 | Integrable systems | 6 | 15 | 2 |
| MAST6021 | MA6521 | Groups, knots and fields | 6 | 15 | 1 or 2 |
| MAST6016 | MA6516 | Fluid dynamics | 6 | 15 | 2 |
| MAST6023 | MA6523 | Mathematics for music | 6 | 15 | 1 or 2 |
| MAST6024 | MA6524 | Metric and normed spaces | 6 | 15 | 1 or 2 |
| MAST6170 | MA617 | Asymptotics and perturbation methods | 6 | 15 | 1 |
| **Stage 4** |
| **Compulsory Modules** |
| MAST5780 | MA578 | Dissertation for MMath Mathematics | 7 | 30 | 1&2 |
| **Optional Modules** Students must select 120 credits from the following. Availability of modules on the list will depend on whether appropriate pre-requisite and co-requisite modules have been taken and on whether the module is available. Scheduling of particular modules in autumn or spring term where indicated as ‘1 or 2’ will ensure a reasonable balance across terms for those modules that are offered. For further information, refer to the handbook.Only one of each pair of the following modules may be taken at Stages 3 and 4:Linear and non-linear waves, Polynomials in several variables, Topology, Nonlinear systems and applications, Orthogonal polynomials and special functions, Discrete mathematics, Graphs and combinatorics, Groups and representations, Quantum mechanics, Operators and matrices, Symmetry methods for differential equations, Integrable systems, Groups, knots and fields, Fluid dynamics, Mathematics for music, Metric and normed spaces, Asymptotics and perturbation methods, Communicating mathematics.Communicating mathematics must be taken at either Stage 3 or Stage 4. |
| MAST7002 | MA791 | Linear and non-linear waves | 7 | 15 | 1 |
| MAST7027 | MA7527 | Polynomials in several variables | 7 | 15 | 1 |
| MAST7032 | MA7532 | Topology | 7 | 15 | 1 |
| MAST7703 | MA7503 | Communicating mathematics | 7 | 15 | 1 |
| **One of the two modules below will run each year** |
| MAST7044 | MA7544 | Nonlinear systems and applications | 7 | 15 | 2 |
| MAST7026 | MA7526 | Orthogonal polynomials and special functions | 7 | 15 | 2 |
| **One of the two modules below will run each year** |
| MAST7015 | MA7515 | Discrete mathematics | 7 | 15 | 2 |
| MAST9950 | MA995 | Graphs and combinatorics | 7 | 15 | 2 |
| **The indicative list of modules below will run to provide a balanced programme with adequate choice.** |
| MAST7003 | MA776 | Groups and representations | 7 | 15 | 1 or 2 |
| MAST7004 | MA967 | Quantum mechanics | 7 | 15 | 1 or 2 |
| MAST7005 | MA792 | Operators and matrices | 7 | 15 | 1 or 2 |
| MAST7001 | MA790 | Symmetry methods for differential equations | 7 | 15 | 1 |
| MAST7022 | MA7522 | Integrable systems | 7 | 15 | 2 |
| MAST7021 | MA7521 | Groups, knots and fields | 7 | 15 | 1 or 2 |
| MAST7016 | MA7516 | Fluid dynamics | 7 | 15 | 2 |
| MAST9680 | MA968 | Mathematics and music | 7 | 15 | 1 or 2 |
| MAST7024 | MA7524 | Metric and normed spaces | 7 | 15 | 1 or 2 |
| MAST8710 | MA871 | Asymptotics and perturbation methods | 7 | 15 | 1 |
| MAST9620 | MA962 | Geometric integration | 7 | 15 | 1 or 2 |
| MAST5610 | MA561 | Introduction to Lie groups and Lie algebras | 7 | 15 | 1 or 2 |
| MAST9720 | MA972 | Algebraic curves in nature | 7 | 15 | 1 or 2 |
| MAST9640 | MA964 | Applied algebraic topology | 7 | 15 | 1 or 2 |

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| **18 Work-Based Learning**Disability Statement: Where disabled students are due to undertake a work placement as part of this programme of study, a representative of the University will meet with the work placement provider in advance to ensure the provision of anticipatory and reasonable adjustments in line with legal requirements. |

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| **19 Support for Students and their Learning** |
| * School and University induction programme
* Programme/module handbooks
* Library services <http://www.kent.ac.uk/library/>
* Student Support <http://www.kent.ac.uk/studentsupport/>
* Student Wellbeing [www.kent.ac.uk/studentwellbeing/](http://www.kent.ac.uk/studentwellbeing/)
* Centre for English and World Languages <http://www.kent.ac.uk/cewl/index.html>
* Student Learning Advisory Service <http://www.kent.ac.uk/uelt/about/slas.html>
* PASS system <https://www.kent.ac.uk/teaching/qa/codes/taught/annexg.html>
* Academic Adviser system <https://www.kent.ac.uk/teaching/advisers/index.html>
* Kent Union [www.kentunion.co.uk/](http://www.kentunion.co.uk/)
* Careers and Employability Services [www.kent.ac.uk/ces/](http://www.kent.ac.uk/ces/)
* Counselling Service https://www.kent.ac.uk/studentwellbeing/counselling/
* Information Services (computing and library services) [www.kent.ac.uk/is/](http://www.kent.ac.uk/is/)
* Undergraduate student representation at School, Faculty and Institutional levels
* International Recruitment Office <https://www.kent.ac.uk/internationalstudent/>; International Partnerships Office <https://www.kent.ac.uk/global/partnerships/>
* Medical Centre <https://www.kent.ac.uk/studentwellbeing/medicalcentre.html>
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| **20 Entry Profile**The minimum age to study a degree programme at the university is normally at least 17 years old by 20 September in the year the programme begins. There is no upper age limit. |
| 20.1 **Entry Route**For current information, please refer to the University prospectus |
| A level AAA including Mathematics (not Use of Mathematics). Either General Studies or Critical Thinking (but not both) can be accepted against the requirements. Access to HE Diploma The University will not necessarily make conditional offers to all Access candidates but will continue to assess them on an individual basis. If we make you an offer, you will need to obtain/pass the overall Access to Higher Education Diploma and may also be required to obtain a proportion of the total level 3 credits and/or credits in particular subjects at merit grade or above. BTEC Level 3 Extended Diploma (formerly BTEC National Diploma) The University will consider applicants holding BTEC National Diploma and Extended National Diploma Qualifications (QCF; NQF; OCR) on a case-by-case basis. Please contact us for further advice on your individual circumstances. International Baccalaureate 34 points overall or 17 points at HL including Mathematics 6 at HL |
| 20.2 **What does this programme have to offer?** |
| * An excellent grounding in Mathematics at university level
* The opportunity to study mathematics including its real-life applications in a friendly and research active environment with a dedicated professional teaching staff
* The development of a broad range of skills that are highly sought after by employers, and which open up a wide variety of careers
* The enhancement of core mathematics knowledge and skills with the further training needed for a mathematics-based career
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| 20.3 **Personal Profile** |
| * A keen interest in mathematics and how it is used in the modern world
* A desire to gain wide mathematical knowledge, to explore a range of real-life applications, and further to develop a deep interest in some particular mathematical topics
* A desire to develop computational and problem-solving skills
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| 21 **Methods for Evaluating and Enhancing the Quality and Standards of Teaching and Learning** |
| 21.1 **Mechanisms for review and evaluation of teaching, learning, assessment, the curriculum and outcome standards** |
| * Student module evaluations
* Annual programme and module monitoring reports <http://www.kent.ac.uk/teaching/qa/codes/taught/annexe.html>
* External Examiners system <http://www.kent.ac.uk/teaching/qa/codes/taught/annexk.html>
* Periodic programme review <http://www.kent.ac.uk/teaching/qa/codes/taught/annexf.html>
* Annual staff appraisal
* Peer observation
* Quality Assurance Framework <http://www.kent.ac.uk/teaching/qa/codes/index.html>
* QAA Higher Education Review <http://www.qaa.ac.uk/InstitutionReports/types-of-review/higher-education-review/Pages/default.aspx>
* Personal Academic Support System (PASS): monitoring attendance and other measures of diligence within the system of personal academic advisors, student support advisor and senior tutor
* Three-stage vetting process of examination questions: module team, moderators and external examiners
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| 21.2 **Committees with responsibility for monitoring and evaluating quality and standards** |
| * Staff-Student Liaison Committee
* School Education Committee
* Faculty Education Committee
* Faculty Board
* Education Board
* Board of Examiners
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| 21.3 **Mechanisms for gaining student feedback on the quality of teaching and their learning experience** |
| * Student module evaluations
* Staff-Student Liaison Committee
* Student rep system (School, Faculty and Institutional level)
* Annual NSS
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| 21.4 **Staff Development priorities include:** |
| * PGCHE requirements
* HEA (associate) fellowship membership
* Annual appraisals
* Institutional Level Staff Development Programme
* Academic Practice Provision (PGCHE, other development opportunities)
* Professional body membership and requirements
* Programme team meetings
* Research seminars
* Conferences
* Study leave
* Equality, Diversity and Inclusivity (EDI) awareness
* Mentoring of new staff
* Committee and module team responsibilities
* Staff development courses
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| 22 **Indicators of Quality and Standards** |
| * Results of periodic programme review March 2017
* Professional accreditation by Institute of Mathematics and Its Applications
* QAA Higher Education Review 2015
* Annual External Examiner reports
* Annual programme and module monitoring reports
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| 22.1 **The following reference points were used in creating these specifications:** |
| * QAA UK Quality Code for Higher Education http://www.qaa.ac.uk/assuring-standards-and-quality
* QAA Benchmarking statement for Mathematics, Statistics and Operational Research 2015
* Accreditation standards of Institute of Mathematics and Its Applications
* School and Faculty plan
* University Plan <https://www.kent.ac.uk/about/plan/> and Learning and Teaching Strategies https://www.kent.ac.uk/uelt/strategies/lta.html
* Staff research activities
* Kent Inclusive Practices (<https://www.kent.ac.uk/studentsupport/accessibility/inclusive-practice.html>)
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| 23 **Inclusive Programme Design**  |
| The School recognises and has embedded the expectations of current equality legislation, by ensuring that the programme is as accessible as possible by design. Additional alternative arrangements for students with Inclusive Learning Plans (ILPs)/declared disabilities will be made on an individual basis, in consultation with the relevant policies and support services. |

*Template last updated November 2017*

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| **MMath in Mathematics** |
| **Learning outcome by module** |
| **Level and module** | **A: Knowledge and Understanding** | **B: Intellectual skills** | **C: Subject-specific skills** | **D: Transferable skills** |
| **Level 4** |  | **A1** | **A2** | **A3** | **A4** | **A5** | **A6** | **B1** | **B2** | **B3** | **B4** | **B5** | **B6** | **B7** | **B8** | **C1** | **C2** | **C3** | **C4** | **D1** | **D2** | **D3** | **D4** | **D5** | **D6** | **D7** | **D8** |
| MAST4006 | Mathematical methods 1 | X | X |  | X |  |  | X | X | X |  | X | X |  |  | X | X | X | X | X | X | X |  | X |  | X |  |
| MAST4007 | Mathematical methods 2 | X | X |  | X |  |  | X | X | X |  | X | X |  |  | X | X | X | X | X | X | X |  | X |  | X |  |
| MAST4009 | Probability | X | X |  | X |  |  | X | X | X |  | X |  |  |  | X | X |  | X | X | X | X |  | X |  | X |  |
| MAST4011 | Statistics | X | X |  | X |  |  | X | X | X |  | X | X |  |  | X | X | X | X | X | X | X |  | X | X | X |  |
| MAST4010 | Real analysis 1 | X |  |  |  | X |  | X | X | X | X |  |  |  |  | X | X |  | X | X | X | X |  | X |  | X |  |
| MAST4001 | Algebraic methods | X | X |  | X | X |  | X | X | X | X | X | X |  |  | X | X | X | X | X | X | X |  | X |  | X |  |
| MAST4004 | Linear algebra | X |  |  |  | X |  | X | X | X | X |  | X |  |  | X | X | X | X | X | X | X |  | X | X | X |  |
| MAST4002 | Applications of mathematics | X |  |  | X |  |  | X | X | X |  | X |  |  |  | X | X |  | X | X | X | X |  | X |  | X |  |
| **Level 5** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MAST5013 | Real analysis 2 | X |  |  |  | X |  | X | X | X | X |  |  |  |  | X | X |  | X | X | X | X |  | X |  | X |  |
| MAST5005 | Linear partial differential equations | X | X |  | X |  |  | X | X | X |  | X |  |  |  | X | X |  | X | X | X | X |  | X |  | X |  |
| MAST5003 | Groups and symmetries | X |  |  |  | X |  | X | X | X | X |  |  |  |  | X | X |  | X | X | X | X |  | X |  | X |  |
| MAST5009 | Numerical methods | X | X |  |  | X |  | X | X | X |  | X | X |  |  | X | X | X | X | X | X | X |  | X |  | X |  |
| MAST5007 | Mathematical statistics | X | X |  | X |  |  | X | X | X |  | X |  |  |  | X | X |  | X | X | X | X |  | X |  | X |  |
| MAST5660 | Number theory | X |  |  |  | X |  | X | X | X | X |  |  |  |  | X | X |  | X | X | X | X |  | X |  | X |  |
| MAST5012 | Ordinary differential equations | X | X |  | X | X |  | X | X | X |  | X | X |  |  | X | X | X | X | X | X | X |  | X |  | X |  |
| MAST5014 | Rings and fields | X |  |  | X | X |  | X | X | X | X | X |  |  |  | X | X |  | X | X | X | X |  | X |  | X |  |
| MAST5002 | Curves and surfaces | X |  |  |  | X |  | X | X | X | X |  |  |  |  | X | X |  | X | X | X | X |  | X |  | X |  |
| MAST5004 | Lagrangian and Hamiltonian dynamics | X |  |  | X |  |  | X | X | X |  | X |  |  |  | X | X |  | X | X | X | X |  | X |  | X |  |
| MAST5001 | Applied statistical modelling 1 | X | X |  | X |  |  | X | X | X |  | X | X |  |  | X | X | X | X | X | X | X |  | X |  | X |  |
| **Level 6** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MAST6017 | Functions of a complex variable | X | X |  | X | X |  | X | X | X | X | X |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST5870 | Numerical solution of differential equations | X | X |  | X |  |  | X | X | X |  | X | X | X |  | X | X | X | X | X | X | X |  | X |  | X | X |
| MAST6018 | Games and strategy | X | X |  | X |  |  | X | X | X |  | X |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST6002 | Linear and nonlinear waves |  | X | X | X |  |  | X | X | X |  | X | X | X |  | X | X | X | X | X | X | X |  | X |  | X | X |
| MAST5740 | Polynomials in several variables |  | X | X |  | X |  | X | X | X | X |  |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST5670 | Topology | X | X | X |  | X |  | X | X | X | X |  |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST6044 | Nonlinear systems and applications |  | X | X | X |  |  | X | X | X |  | X |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST5680 | Orthogonal polynomials and special functions |  | X |  | X |  |  | X | X | X |  | X |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST5490 | Discrete mathematics | X | X | X |  | X |  | X | X | X | X |  |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST5950 | Graphs and combinatorics | X | X | X |  | X |  | X | X | X | X |  |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST5760 | Groups and representations |  | X | X |  | X |  | X | X | X | X |  |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST6004 | Quantum mechanics | X | X |  | X |  |  | X | X | X |  | X |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST6005 | Operators and matrices |  | X |  |  | X |  | X | X | X | X |  |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST6001 | Symmetry methods for differential equations |  | X | X | X |  |  | X | X | X |  | X |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST6022 | Integrable systems | X | X | X | X |  |  | X | X | X |  | X |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST6021 | Groups, knots and fields |  | X | X |  | X |  | X | X | X | X |  |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST6016 | Fluid dynamics | X | X | X | X |  |  | X | X | X |  | X |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST6023 | Mathematics for music |  | X |  | X |  |  | X | X | X |  | X |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST6024 | Metric and normed spaces |  | X | X |  | X |  | X | X | X | X |  |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST6170 | Asymptotics and perturbation methods |  | X |  | X |  |  | X | X | X |  | X |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST6091 | Mathematics in the World of Finance |  |  |  | X |  |  |  |  | X |  | X |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST6703 | Communicating mathematics |  |  |  |  |  |  | X | X | X |  |  | X | X |  | X | X | X | X | X | X | X |  | X |  | X | X |
| MAST6360 | Stochastic processes | X | X |  | X |  |  | X | X | X |  | X |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST6390 | Time series modelling and simulation | X | X |  | X |  |  | X | X | X |  | X | X | X |  | X | X | X | X | X | X | X |  | X |  | X | X |
| MAST6029 | Statistical learning | X | X |  | X |  |  | X | X | X |  | X | X | X |  | X | X | X | X | X | X | X |  | X |  | X | X |
| MAST6028 | Principles of data collection | X | X |  | X |  |  | X | X | X |  | X | X | X |  | X | X | X | X | X | X | X |  | X |  | X | X |
| MAST6012 | Applied statistical modelling 2 | X | X |  | X |  |  | X | X | X |  | X | X | X |  | X | X | X | X | X | X | X |  | X | X | X | X |
| MAST7710 | Computational statistics | X | X |  | X |  |  | X | X | X |  | X | X | X |  | X | X | X | X | X | X | X |  | X |  | X | X |
| MAST5380 | Applied Bayesian modelling | X | X |  | X |  |  | X | X | X |  | X | X | X |  | X | X | X | X | X | X | X |  | X |  | X | X |
| **Level 7** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MAST5780 | MMath Dissertation |  |  |  |  |  | X | X | X | X |  |  |  | X | X | X | X |  | X | X | X | X | X | X |  | X | X |
| MAST7002 | Linear and non-linear waves |  | X | X | X |  |  | X | X | X |  | X | X | X |  | X | X | X | X | X | X | X |  | X |  | X | X |
| MAST7027 | Polynomials in several variables |  | X | X |  | X |  | X | X | X | X |  |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST7032 | Topology | X | X | X |  | X |  | X | X | X | X |  |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST7044 | Nonlinear systems and applications |  | X | X | X |  |  | X | X | X |  | X |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST7026 | Orthogonal polynomials and special functions |  | X |  | X |  |  | X | X | X |  | X |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST7015 | Discrete mathematics | X | X | X |  | X |  | X | X | X | X |  |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST9950 | Graphs and combinatorics | X | X | X |  | X |  | X | X | X | X |  |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST7003 | Groups and representations |  | X | X |  | X |  | X | X | X | X |  |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST7004 | Quantum mechanics | X | X |  | X |  |  | X | X | X |  | X |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST7005 | Operators and matrices |  | X |  |  | X |  | X | X | X | X |  |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST7001 | Symmetry methods for differential equations |  | X | X | X |  |  | X | X | X |  | X |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST7022 | Integrable systems | X | X | X | X |  |  | X | X | X |  | X |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST7021 | Groups, knots and fields |  | X | X |  | X |  | X | X | X | X |  |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST7016 | Fluid dynamics | X | X | X | X |  |  | X | X | X |  | X |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST9680 | Mathematics for music |  | X |  | X |  |  | X | X | X |  | X |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST7024 | Metric and normed spaces |  | X | X |  | X |  | X | X | X | X |  |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST8710 | Asymptotics and perturbation methods |  | X |  | X |  |  | X | X | X |  | X |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST9620 | Geometric integration |  | X |  | X |  |  | X | X | X |  | X |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST5610 | Introduction to Lie groups and Lie algebras |  | X | X | X | X |  | X | X | X | X | X |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST9720 | Algebraic curves in nature |  |  | X |  | X |  | X | X | X | X |  |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST9640 | Applied algebraic topology |  |  | X |  | X |  | X | X | X | X |  |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |
| MAST7703 | Communicating mathematics |  |  |  |  |  |  | X | X | X |  |  |  | X |  | X | X |  | X | X | X | X |  | X |  | X | X |