BSc Mathematics **UCAS code: G100**
For students entering Part 1 in 2015/6

Awarding Institution:	University of Reading
Teaching Institution:	University of Reading
Relevant QAA subject Benchmarking group(s):	Mathematics, Statistics and Operational Research
Faculty:	Science Faculty
Programme length:	3 years
Date of specification:	19/Dec/2017
Programme Director:	Dr Peter Chamberlain
Programme Advisor:	Dr Peter Chamberlain
Board of Studies:	School of Mathematical and Physical Sciences
Undergraduate	
Accreditation:	Accredited by the Institute of Mathematics and its applications to meet the educational requirements of the Chartered Mathematician designation when followed by subsequent training and experience in employment to obtain competencies to those specified by the QAA for taught masters degrees.
Optional placement variation(s):	with Placement Experience

Summary of programme aims
The BSc programme in Mathematics aims to provide a good general mathematical education for those not necessarily intending to continue as professional mathematicians. This is achieved by providing core material in the first two years and then in the third year a blend of courses, some giving an overview of a broad area of mathematics and others studying a particular topic in depth, along with a range of appropriate subject-specific and transferable skills.

Transferable skills
During the course of their studies at Reading, all students will be expected to enhance their academic and personal transferable skills. In following this programme, students will have had the opportunity to develop such skills, in particular relating to career management, communication (both written and oral), information handling, numeracy, team working, use of IT and problem-solving and will have been encouraged to further develop and enhance the full set of skills through a variety of opportunities available outside their curriculum.
By the end of the programme students are expected to have gained experience and show competence in the following transferable skills: IT (word-processing, using standard and mathematics software), scientific writing, oral presentation, team-working, problem-solving, use of library resources, time-management, and career management and planning.

Programme content
The profile which follows states which modules must be taken (the compulsory part), together with one or more lists of modules from which the student must make a selection (the optional modules). Students must choose such additional modules as they wish, in consultation with their programme adviser, to make 120 credits in each Part. The number credits per module and the level of each module are shown after its title.

Part 1 (three terms)
Compulsory modules

Compulsory modules

Mod Code	*Module Title*	*Credits*	*Level*
MA1FM	Foundations of Mathematics	20	4
MA1CA	Calculus	20	4
MA1LA	Linear Algebra	20	4

Selected modules

Students following this programme in Part 1 need to take the following modules Student's transferring to this programme after Part 1 are permitted to have taken up to 60 credits of their joint subject according to their joint programme specification.
Core modules

Mod Code	Module Title	Credits	Level
MA1RA1	Real Analysis I	20	4
ST1PS	Probability and Statistics	20	4
MA1ALG	Algebra I	10	4
MA1MM	Mathematical Modelling	10	4

Part 2 (three terms)
Compulsory modules

Code	*Module title*	*Credits*	*Level*
MA2ODE	Ordinary Differential Equations	10	5
MA2PDE	Partial Differential Equations	10	5
MA2GS	General Skills	10	5
MA2MIP	Mathematics in Practice	10	5
MA2VC	Vector Calculus	10	5
MA2NA1	Numerical Analysis I	10	5
MA2CA1	Complex Analysis I	10	5
Plus either			
MA2AL2	Algebra II	10	5
Or			
MA2ALG	Algebra I	10	5
Plus either			
MA2RA2	Real Analysis II	10	5
Or			
MA2RA	Real Analysis	20	5

Optional modules
(i) Choose a minimum of 10 and a maximum of 40 credits from:

Code	*Title*	*Credits*	*Level*
MA2ASV	Analysis in Several Variables	10	5
MA2PT1	Probability Theory I	10	5
MA2MPH	Mathematical Physics	10	5
ST2MS	Medical Statistics	10	5
ST2ST	Statistical Theory	10	5
ST2LM	Linear Models	10	5
MA2SPL	Summer Placement	10	5

(ii) Select a minimum of 0 and a maximum of 20 credits from:

Code	*Title*	*Credits*	*Level*
LA1XXX	Modern Language	20	4
MT2CC	The Science of Climate Change	10	5
MM270	The Practice of Entrepreneurship	20	5
ST2PS	Probability and Statistics	20	5

Year abroad/Year away/Additional year (three terms)
Compulsory modules

MA2PY	Industrial Placement Year	120	5

The placement should not normally be shorter than nine months full-time and students will be assessed in the form of an end-of-year project.

Part 3 (three terms)

Compulsory modules

Code	*Module Title*	*Credits*	*Level*
MA3CA1	Complex Analysis I	10	6
MA3PR	Project	10	6
Or			
ST3PR	Statistics Project	20	6

Optional Modules
Students must take 120 credits of optional modules from a list available from the Department of Mathematics and Statistics, at least 70 of which must be Mathematics modules. The selection must include a Mathematics or Statistics project, or a peer assisted learning module.

Code	*Title*	*Credits*	*Level*
MA3CA2	Complex Analysis II	10	6
MA3TLA	Topology and Linear Analysis	20	6
MA3FA1	Functional Analysis I	10	6
MA3Z7	Number Theory	10	6
MA3CEC	Cryptography and Error Correcting Codes	10	6
MA3GT	Galois Theory	20	6
MA3NAT	Numerical Analysis II	20	6
MA3CV	Calculus of Variations	10	6
MA3AGT	Applied Graph Theory	10	6
MA3DS	Dynamical Systems	10	6
MA3MB	Mathematical Biology	10	6
MA3CM	Classical Mechanics	10	6
MA3FM	Fluid Mechanics	10	6
MA3AST	Applied Stochastic Processes	10	6
MA3WW	Water Waves	10	6
MA3MTI	Measure Theory and Integration	10	6
MA3PD2	Partial Differential Equations II	10	6
ST3MVA	Multivariate Data Analysis	10	6
ST3GLM	Generalised Linear Models	10	6
ST3MSD	Modelling Structured Data	10	6
ST3ED	Experimental Design	10	6
ST3BDA	Bayesian Data Analysis	10	6
ST3CTS	Computational Techniques in Statistics	10	6

Progression requirements
To gain a threshold performance at Part 1 and qualify for the CertHE a student shall normally be required to achieve an overall weighted average of 40% over 120 credits taken in Part 1, where all the credits are at 4 level or above, and a mark of at least 30% in individual modules amounting to not less than 100 credits. In order to progress from Part 1 to Part 2, a student shall normally be required to achieve a threshold performance at Part 1 and obtain a weighted average of least 40% over the modules MA1CA, MA1LA, MA1FM and obtain marks of at least 30% in 120 credits.

To gain a threshold performance at Part 2, a student shall normally be required to achieve:
(i) a weighted average of 40% over 120 credits taken at Part 2;
(ii) marks of at least 40% in individual modules amounting to not less than 80 credits; and
(iii) marks of at least 30% in individual modules amounting to not less than 120 credits.
In order to progress from Part 2 to Part 3, a student must achieve a threshold performance.

Students are required to pass the professional/placement year in order to progress on the programme which incorporates the professional/placement year. Students who fail the professional/placement year transfer to the non-placement year version of the programme.

Summary of Teaching and Assessment
The University's honours classification scheme is:

Mark	*Interpretation*
70% - 100%	First class
60% - 69%	Upper Second class
50% - 59%	Lower Second class
40% - 49%	Third class
35% - 39%	Below Honours Standard
0% - 34%	Fail

For the University-wide framework for classification, which includes details of the classification method, please see: www.reading.ac.uk/internal/exams/Policies/exa-class.aspx

The weighting of the Parts/Years in the calculation of the degree classification is

Three-year programmes
Part 2 one-third
Part 3 two-thirds
Four-year programmes, including placement year: Normally
Part 2 one-third
Placement Year not included in classification
Part 3 two-thirds
(where students fail a placement year which does not contribute to classification they transfer to the three-year version of the programme)

Teaching is organised in modules that typically involve both lectures and problems. The assessment is carried out within the University's degree classification scheme, details of which are in the programme handbooks. The pass mark in each module is 40%. Modules in Part 1 and 2 are assessed by a mixture of coursework and formal examination. There are some modules which are assessed wholly by coursework and others wholly by examination; the details are given in the module descriptions.

Admission requirements
Entrants to this programme are normally required to have obtained:
- UCAS Tariff: A Level: ABB including grade A in A Level Mathematics;
- International Baccalaureate: 32 points including 6 in Higher Mathematics.

Equivalent qualifications are acceptable.

Admissions Tutor: Dr Calvin Smith

Support for students and their learning
University support for students and their learning falls into two categories. Learning support is provided by a wide array of services across the University, including: the University Library, In-sessional English Support Programme, the Study Advice and Mathematics Support teams and IT Services. There are language laboratory facilities both for those students studying on a language degree and for those taking modules offered by the Institution-wide Language Programme. Student guidance and welfare support is provided by Personal Tutors, School Senior Tutors, the Students' Union, the Medical Practice and the Support Centres. If a student has a general enquiry and is unsure where to seek help, they should visit their Support Centre. There are five Support Centres across the University, including one based at the London Road Campus. The Support Centre will be able to advise on matters such as extenuating circumstances, module selection, suspensions, withdrawals, timetable queries and transferring programme. The Support Centre will also be able to signpost students to Carrington building where other University services related to disability, financial support, counselling and wellbeing, accommodation and careers can be found. More information on what student services are available can be found here: http://student.reading.ac.uk/essentials.

Within the Mathematics & Statistics Department additional support is given though practical classes in Part 1. The development of problem-solving skills is assisted by provision of model solutions to problems. There is a Programme Adviser to offer advice on the choice of modules within the programme.

Career learning

Career prospects
Mathematics graduates typically find employment in areas such as finance, accountancy, actuarial work, management services and teaching, as well as further study and research and some less common choices. In recent years students who have followed this programme have gone into jobs as actuarial trainee, trainee chartered accountant, IT management trainee, teaching, business analyst and postgraduate study.

Opportunities for study abroad
There are currently no opportunities for Study Abroad on this programme.

Placement opportunities
A version of this programme which includes a maxi placement is available (BSc Mathematics with a Placement Year).

Programme Outcomes
The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills, qualities and other attributes in the following areas:

Knowledge and Understanding

A. Knowledge and understanding of:	**Teaching/learning methods and strategies**
1. The fundamental concepts and techniques of calculus, analysis, algebra and numerical mathematics 2. The use of the basic techniques of mathematics in applicable areas of mathematics, such as differential equations, mechanics and numerical analysis 3. A selection of more specialist optional topics 4. Some of the breadth of topics which can be tackled by mathematics	The knowledge required for the basic topics is delineated in formal lectures supported by problem sets for students to tackle on their own. In Part 1 these are supported by tutorials and practical classes through which students can obtain feedback on their non-assessed work. In the later parts of the course students are expected to work at additional problems on their own and seek help when required, using the office hours of staff. Where appropriate, model solutions are provided for problems set. 4. is provided by the project module *Assessment* Most knowledge is tested through a combination of coursework and unseen formal examinations. Dissertations and oral presentations also contribute in other parts of the programme.

Skills and other attributes

B. Intellectual skills - *able to:*	**Teaching/learning methods and strategies**
1. Think logically 2. Analyse and solve problems 3. Organise tasks into a structured form 4. Transfer appropriate knowledge and methods from one topic within the subject to another 5. Conduct independent study of a chosen topic and report on the results	Logic is an essential part of the understanding and construction of mathematical proofs and is embedded throughout the programme. The quality of a solution to a problem is substantially determined by the structure of that response; analysis, synthesis, problem solving, integration of theory and application, and knowledge transfer from one topic to another are intrinsic to high-level performance in the programme. *Assessment* 1- 3 are assessed indirectly in most parts of Mathematics, while 4 contributes to the more successful work. 5 is assessed in the report produced as part of the project module

C. Practical skills - *able to:*

1. Understand and construct mathematical proofs
2. Formulate and solve mathematical problems
3. Analyse numerical methods and respond to the issues of accuracy, stability and convergence
4. Write and present orally a report on a chosen topic

Teaching/learning methods and strategies

Mathematical proof is taught in Part 1 lectures and reinforced in practical classes. Problem solving is introduced in lectures in Part 1 and forms a large part of subsequent Mathematics. Numerical analysis courses introduce and develop the ideas of accuracy, stability and convergence, illustrated by practical tasks.

Assessment
1 and 2 are tested both formatively in coursework and summatively in examinations. 3 is assessed practically through coursework and the principles through formal examination. 4 is assessed through the project dissertation and its oral presentation.

D. Transferable skills - *able to:*

1. Use IT (word-processing, using standard and mathematical software)
2. Communicate scientific ideas
3. Give oral presentations
4. Work as part of a team
5. Use library resources
6. Manage time
7. Plan their career

Teaching/learning methods and strategies

The use of IT is embedded throughout the computational side of the course. Team work and career planning are part of the modules Mathematics in Practice and General Skills. Communication skills are the focus of a module in Part 2, and these are deployed in the final year project. Time management is essential for the timely and effective completion of the programme. Library resources are required for the small project within one Part 2 module and the final year project, and contribute to the best performances throughout.

Assessment
1 and 2 are assessed through coursework. 3 - 5 and 7 contribute assessed coursework towards the Part 2 modules General Skills and Mathematics in Practice, and 2, 3 and 5 also in the project. Effective use of all of these skills will enhance performance in later modules.

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 takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in the module description and in the programme handbook. The University reserves the right to modify this specification in unforeseen circumstances, or where the process of academic development and feedback from students, quality assurance process or external sources, such as professional bodies, requires a change to be made. In such circumstances, a revised specification will be issued.