UNIVERSITY OF LEICESTER

Programme Specification (Undergraduate)

For students entering in 2017/18

Date amended: June 2018

1. Programme Title(s) and UCAS code(s):

BSc Mathematics (G100)
BSc Mathematics with a year abroad (Europe) (G101)
BSc Mathematics with a year abroad (USA) G103
MMath Mathematics G105
MMath Mathematics with a year abroad (USA) (G107)
BSc Mathematics with Foundation Year (G199)

2. Awarding body or institution:

University of Leicester

3. a) Mode of study:

Full-time

b) Type of study:

On campus

4. Registration periods:

The normal period of registration for the BSc programme is three years. The maximum period of registration for the BSc programme is five years.
The normal period of registration for the MMath programme is four years. The maximum period of registration for the MMath programme is six years.
The normal period of registration for the BSc (Europe) Mathematics programme is four years. The maximum period of registration for the BSc (Europe) Mathematics programme is six years.
For Foundation Year Variant:
The normal period of registration for the BSc is four years (one year for the Foundation Year, with three years for the BSc). The maximum period of registration for the BSc is six years (one year for the Foundation Year, and five years for the BSc).

5. Typical entry requirements:

340 points normally including AAB at A level with A in Mathematics.

For Foundation Year Variant:

A level: ABB or points equivalent from best three A levels. Typically in subjects outside of the 'usual' A levels expected by the department. BTEC Diploma: DDM in appropriate subject area. Access to HE courses in Science and Engineering: 45 L3 credits, including 30 at Distinction and remaining L3 credits at least at Merit.

6. Accreditation of Prior Learning:

APL will not be accepted for exemptions from individual modules, however may be considered for direct entry to year 2, on a case by case and subject to the general provisions of the University APL policy.

Foundation year variant

None

7. Programme aims:

The programme aims to

- foster confidence, convey knowledge and develop expertise in mathematics, including an appreciation of the usefulness of mathematics;
- provide an education and training in mathematics which includes fundamental concepts and gives an indication of the breadth of mathematics;
- develop an appreciation of the necessity for rigorous justification of assertions and the need for logical arguments;
- develop the ability to model the world using mathematics, and to be able to produce relevant and robust solutions to real world problems;
- enable students to develop self-confidence gained through the provision of careful guidance in the first level, with increasing independence later;
- improve students' team working skills;
- stimulate intellectual development and develop powers of critical analysis, problem solving,
- written communication skills and improve presentational skills;
- develop the ability to communicate solutions to problems and mathematical concepts in general using language appropriate to the target audience;
- develop competence in IT, in particular the use of mathematical software and programming;
- enhance practical computing skills by learning software in common use;
- raise students' expertise and understanding to a point where they could embark upon postgraduate mathematical study;
- develop the ability to complete independent project;
- enable students to develop and broaden their learning experience in Mathematics by studying at a non-UK University (for the year abroad options);
- enable students to develop their linguistic abilities, by attending lectures and classes and completing assessments in the native language of a non-UK, European University (for the in Europe degree)

For Foundation Year variant, see Foundation Year Programme Specification

8. Reference points used to inform the programme specification:

- QAA Framework for Higher Education Qualifications in England, Wales and Northern Ireland
- QAA Benchmarking Statement Mathematics, Statistics and Operational Research (MMath)
- QAA Annex to subject benchmark statement: Mathematics, statistics and operational research (2009)
- PDR report (April 2011)
- University Learning Strategy
- University Employability Strategy
- NSS Survey (2014)
- First Destination Survey
- External Examiner's Reports

9. Programme Outcomes:

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
(a) Discipline specific knowledge and competencies		
(i) Mastery of an appropriate body of knowledge		

Knowledge of basic theory, basic techniques of analysis, algebra, applied mathematics, and statistics. Ability to recognise sound argumentation and valid proofs. Knowledge of basic techniques, and model problems. Knowledge of a computing languages and software.	Lectures, specified reading, problem classes, surgeries, poster presentations. In addition, elements of e-Learning are incorporated. Computer practical classes.	Written examinations, assessed written and computational problems. Assessed oral and poster presentations. Assessed written projects and problem sheets and seminar discussions. Assessed practical classes.
(ii) Understanding and application of key concepts and techniques		
Novel applications of basic knowledge. Exposition of logical structure. Ability to generalise and specialise. Proof techniques. Ability to apply an algorithm for the solution of a standard problem. Ability to apply theorems to solve particular problems. Mathematical modelling. Application of computer algorithms for solving finance problems.	Lectures, tutorials, problem classes, marked assignments. Lectures, tutorials, problem classes, marked assignments. Computer practical classes.	Written examination, assessed problems, project report. Written examinations, assessed problems. Assessed practical classes.
(iii) Critical analysis of key issues		
Analysis of problem and selection of appropriate proof or solution strategy. Critical appraisal of solutions. Analyse and solve more `messily defined' finance management problems. Analysis of IT problems.	Lectures, problem classes, feedback on assessed problems, project supervision.	Written examinations, assessed problems, Project report.
(iv) Clear and concise presentation of material		
Presentation of results (both informal and to a variety of audiences), participation in scientific discussion. Ability to write coherent reports. Software presentation.	Tutorials, Group workshops, Presentation workshops, project supervision. Feedback on assessed written pieces. Guidance from project supervisor.	Group presentations. Project presentations. Assessed essays. Project presentation.
(v) Critical appraisal of evidence with appropriate insight		
Project design.	Project supervision	Project reports.

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
(vi) Other discipline specific competencies		
Knowledge of mathematical software such as MATLAB and MAPLE. Mathematical modelling skills. Language of finance.	Lab classes, and purpose designed handbooks. Group projects. Project and lectures, eLearning.	Log books of practical sessions. Reflective blogs. Use of MAPLE in basic skills tests. Project reports. Written examinations and presentations.
(b) Transferable skills		
(i) Oral communication		
Response to questioning Scientific communication Project and poster presentation	Tutorials, workshops. Tutorials, workshops. Project supervision, presentation workshops.	Presentation assessment.
(ii) Written communication		
Report writing. Mathematical communication	Project supervisions. Tutorials.	Assessed reports. Assessed questions.
(iii) Information technology		
Use of Windows. Use of specialist packages. Office software.	Induction. Laboratories.	Marked project work. Project reports.
(iv) Numeracy		
Use of analytical and graphical methods.	Throughout	Written examinations, project reports.
(v) Team working		
Scientific discussion. Organization, time management	Group problem solving. Group projects.	Group assessment (including peer assessment).
(vi) Problem solving		
Analysis, breakdown, synthesis, critical examination. Mathematical modelling skills.	Lectures, problem workshops, group work, projects.	Marked problems, group work assessment, project assessment.
(vii) Information handling		
Conduct background research and literature surveys. Summarise content from information sources. Ability to learn from e-learning resources.	Project supervision. Blackboard stored e-learning resources.	Individual and group project reports. Some assessed material only provided through e-learning resources.
(viii) Skills for lifelong learning		
Study skills. Independence and time management. Careers and business awareness. Information retrieval.	Resource based learning. Study skills booklet. Structured support decreasing through years. Guest speakers. Induction library session. Study skills handbook. Project supervision.	Examinations, assessed problems, project assessments. Meeting deadlines.

10. Progression points:
In cases where a student has failed to meet a requirement to progress he or she will be required to withdraw from the course.
For Foundation Year Variant:
Progression from Year 0 to year 1: In cases where a student has failed to meet a requirement to progress he or she will be required to withdraw from the course.
Students will be required to pass Foundation Year in order to progress to Year 1 with an average module mark of at least 60%). Students are required to have a mark of at least 60% in NS0031 and NS0032 to progress onto the BSc Mathematics.

11. Scheme of Assessment
The programme follows the standard scheme of award and classification set out in Senate Regulation 5.

12. Special features:
Options for these degrees include: Second year abroad in USA and a third year abroad in Europe (Erasmus). As none of these options are materially affected by the changes to the programme detailed here, these options will not be treated individually.

13. Indications of programme quality
Good results in National Student Survey and positive comments from external examiner.

14. External Examiners
The details of the External Examiner(s) for this programme and the most recent External Examiners' reports can be found here.

Appendix 1: Programme structure (programme regulations)

All programmes to formally include range of non-credit bearing attendance only activities for careers, student support etc.:
MA1903 – House hours
MA1902- Peer support

BSc MATHEMATICS

FIRST YEAR MODULES

SEMESTER 1

Core Modules			Credits
	MA1012	CALCULUS AND ANALYSIS I	10
	MA1112	LINEAR ALGEBRA I	20
	MA1061	PROBABILITY	10
Optional Modules:			
	MA1104	ELEMENTS OF NUMBER THEORY	10
AND	MA1253	MATHEMATICS AND SOCIETY	10
		OR	
		SUPPLEMENTARY SUBJECT	10

SEMESTER 2

Core Modules			Credits
	MA1013	CALCULUS AND ANALYSIS II	20
	MA1113	LINEAR ALGEBRA II	10
	MA1202	INTRODUCTORY STATISTICS	10
Optional Modules			
EITHER			
	MA1254	MATHEMATICS FOR BUSINESS	10
	MA1272	PLANE GEOMETRY	10
		OR	
		SUPPLEMENTARY SUBJECT	20
		Semester Total	60

SECOND YEAR MODULES

SEMESTER 1

Core Modules			Credits
	MA2032	CALCULUS AND ANALYSIS III	20
	MA2132	LINEAR ALGEBRA III	10
	MA2252	INTRODUCTION TO COMPUTING	10

Optional Modules: 20 credits selected from:

Note: Up to 20 credits of Computer Science modules may be selected, subject to approval from the Head of Department. Not more than 20 credits of Computer Science options can be selected across the year.

	MA2510	INVESTIGATIONS IN MATHEMATICS	10
	MA2104	ELEMENTS OF TOPOLOGY	10
		Semester Total	60

SEMESTER 2

Core Modules		Credits
MA2021	DIFFERENTIAL EQUATIONS	20
MA2133	ALGEBRA	20

Optional Modules:

20 credits selected from:

Note: Up to 20 credits of Computer Science modules may be selected, subject to approval from the Head of Department

Not more than 20 credits of Computer Science options can be selected across the year.

MA2261	LINEAR STATISTICAL MODELS	20
MA2262	LINEAR STATISTICAL MODELS	10
MA2511	BUSINESS APPLICATIONS IN MATHEMATICS	10
MA2512	APPLIED ECONOMETRICS	10
	Semester Total	60

THIRD YEAR MODULES

SEMESTER 1

Optional Modules: Three selected from:		Credits
MA3012	SCIENTIFIC COMPUTING	20
MA3071	FINANCIAL MATHEMATICS 1	20
MA3074	INTRODUCTION TO ACTUARIAL MATHEMATICS	20
MA3077	OPERATIONAL RESEARCH	20
MA3002	EQUATIONS OF MATHEMATICAL PHYSICS	20
MA3152	CURVES AND SURFACES	20
MA4080	MATHEMATICAL MODELLING	20
MA4142	REPRESENTATION THEORY OF FINITE GROUPS	20

Up to 20 credits may be substituted from Level 2 and Level 3 Computer Science options by negotiation with the Head of Department.+

Semester Total 60

SEMESTER 2

Optional Modules: Three selected from:		Credits
MA3121	COMPLEX ANALYSIS	20
MA3511	COMMUNICATING MATHEMATICS^	20
MA3513	MATHEMATICS BUSINESS PROJECT^	20
MA3153	NUMBER THEORY	20
MA3101	SQUARING THE CIRCLE AND IRREDUCIBLE POLYNOMIALS	20
MA3201	GENERALIZED LINEAR MODELS	20
MA3517	MATHEMATICS RESEARCH JOURNAL	20
MD3002	MEDICAL STATISTICS	20
MA4011	COMPUTATIONAL PARTIAL DIFFERENTIAL EQUATIONS WITH FINITE ELEMENTS*	20
MA4022	DATA MINING AND NEURAL NETWORKS*	20
MA4061	TOPICS IN MATHEMATICAL BIOLOGY*	20

Up to 20 credits may be substituted from Level 2 and Level 3 Computer Science options by consultation with the Head of Department+

*Students may not take more than two out of the final year options from Level 4.

+Not more than 20 credits of Computer Science options can be selected across the year.

^Only one of these modules must be selected

MMath MATHEMATICS

First and Second year modules: As for BSc Mathematics

THIRD YEAR MODULES

SEMESTER 1

Optional Modules

Three options chosen from Level 3 and Level 4** modules as follows: MA3001-3199^ and MA4001-4200.

Up to 20 credits may be substituted from Level 2 and Level 3 Computer Science options by negotiation with the Head of Department.+

		Credits
MA3012	SCIENTIFIC COMPUTING	20
MA3071	FINANCIAL MATHEMATICS 1	20
MA3074	INTRODUCTION TO ACTUARIAL MATHEMATICS	20
MA3077	OPERATIONAL RESEARCH	20
MA3152	CURVES AND SURFACES	20
MA3002	EQUATIONS OF MATHEMATICAL PHYSICS	20
MA4080	MATHEMATICAL MODELLING	20
MA4142	REPRESENTATION THEORY OF FINITE GROUPS	20
MA4701	ADVANCED READINGS IN MATHEMATICS^^	20
	Semester Total	60

SEMESTER 2

Optional Modules

Two options chosen from Level 3 and Level 4** modules as follows: MA3001-3511^ and MA4001-4200.
Up to 20 credits may be substituted from Level 2 and Level 3 Computer Science options by negotiation with the Head of Department.+

		Credits
MA3121	COMPLEX ANALYSIS	20
MA3511	COMMUNICATING MATHEMATICS^	20
MA3513	MATHEMATICS BUSINESS PROJECT^	20
MA3153	NUMBER THEORY	20
MA3201	GENERALIZED LINEAR MODELS	20
MA3101	SQUARING THE CIRCLE AND IRREDUCIBLE POLYNOMIALS	20
MA3517	MATHEMATICS RESEARCH JOURNAL	20
MD3002	MEDICAL STATISTICS	20
MA4011	COMPUTATIONAL PARTIAL DIFFERENTIAL EQUATIONS WITH FINITE ELEMENTS*	20
MA4022	DATA MINING AND NEURAL NETWORKS*	20
MA4702	ADVANCED READINGS IN MATHEMATICS	20
MA4061	TOPICS IN MATHEMATICAL BIOLOGY	20
	Semester Total	60

**At least 120 credits of the modules taken in years 3 and 4 must be at Level 4.
^^ Only one project module can be taken. MA4701 and MA4702 may not both be taken.

Not more than 20 credits of Computer Science options can be selected across the year.

BSc Mathematics with year abroad (Europe)

Year one as per BSc Mathematics programme

Year two

SEMESTER ONE
MA2032 CALCULUS AND ANALYSIS III (20cr)
MA2132 LINEAR ALGEBRA III (10cr)
MA2252 Introduction to Computing (10cr)
MA2104 Elements of Topology (10cr)
MA2510 Investigations in Mathematics (10cr)

SEMESTER TWO
MA2021 Differential Equations (20cr)
MA2133 Algebra (20cr)
Plus 20 credits of optional modules
MA2261 Linear Statistical Models (20cr)
MA2262 Linear Statistical Models (10cr)
MA2511 Business Applications in Mathematics (10cr
MA2512 Applied Econometrics (10cr)

Year three
The third year will be spent abroad taking an approved course in one of the institutions associated with the Department in a SOCRATES Inter-University Cooperative Programme (ICP). Students will be required to reach a prescribed level of attainment in the work done abroad.

Year four as for the third year of the BSc Mathematics programme

BSc Mathematics with a year abroad (USA)

Year one as per BSc Maths, year two spent in a USA institution

SEMESTER 1

Optional Modules: Three selected from:		Credits
MA3012	SCIENTIFIC COMPUTING	20
MA3071	FINANCIAL MATHEMATICS 1	20
MA3074	INTRODUCTION TO ACTUARIAL MATHEMATICS	20
MA3002	EQUATIONS OF MATHEMATICAL PHYSICS	20
MA3077	OPERATIONAL RESEARCH	20
MA3152	CURVES AND SURFACES	20
MA3201	GENERALIZED LINEAR MODELS	20
MA4142	REPRESENTATION THEORY OF FINITE GROUPS	20

Up to 20 credits may be substituted from Level 2 and Level 3 Computer Science options by negotiation with the Head of Department.+

SEMESTER 2

Optional Modules: Three selected from:		Credits
MA3121	COMPLEX ANALYSIS	20
MA3511	COMMUNICATING MATHEMATICS^	20
MA3513	MATHEMATICS BUSINESS PROJECT^	20
MA3153	NUMBER THEORY	20
MA3101	SQUARING THE CIRCLE AND IRREDUCIBLE POLYNOMIALS	20
MD3002	MEDICAL STATISITCS	20
MA4011	COMPUTATIONAL PARTIAL DIFFERENTIAL EQUATIONS WITH FINITE ELEMENTS*	20
MA4022	DATA MINING AND NEURAL NETWORKS*	20
MA4061	TOPICS IN MATHEMATICAL BIOLOGY*	20

Semester Total 60

Up to 20 credits may be substituted from Level 2 and Level 3 Computer Science options by consultation with the Head of Department

*Students may not take more than two out of the final year options from Level 4.

+Not more than 20 credits of Computer Science options can be selected across the year.

^One of these modules must be selected.

MMath Mathematics (USA)

First year modules: As for MMath Mathematics

Second year spent in a USA institution

THIRD YEAR MODULES

SEMESTER 1

Optional Modules

60 credits of options chosen from Level 3 and Level 4** modules as follows:
MA3001-3199^ and MA4001-4200.
Up to 20 credits may be substituted from Level 2 and Level 3 Computer Science options by negotiation with the Head of Department.+

MA3012	SCIENTIFIC COMPUTING	20
MA3071	FINANCIAL MATHEMATICS 1	20
MA3074	INTRODUCTION TO ACTUARIAL MATHEMATICS	20
MA3152	CURVES AND SURFACES	20
MA3002	EQUATIONS OF MATHEMATICAL PHYSICS	20
MA3077	OPERATIONAL RESEARCH	20
MA4142	REPRESENTATION THEORY OF FINITE GROUPS	20
MA4080	MATHEMATICAL MODELLING	20
MA4701	READING IN MATHEMATICS^^	20
	Semester Total	60

SEMESTER 2

Optional Modules Credits

60 credits of options chosen from Level 3 and Level 4** modules as follows:
MA3001-3511^ and MA4001-4200.
Up to 20 credits may be substituted from Level 2 and Level 3 Computer Science options by negotiation with the Head of Department.+

MA3511	COMMUNICATING MATHEMATICS^	20
MA3513	MATHEMATICS BUSINESS PROJECT^	20
MA3101	SQUARING THE CIRCLE AND IRREDUCIBLE POLYNOMIALS	20
MA3153	NUMBER THEORY	20
MA3121	COMPLEX ANALYSIS	20
MA3201	GENERALIZED LINEAR MODELS	20
MD3002	MEDICAL STATISTICS 20	
MA4011	COMPUTATIONAL PARTIAL DIFFERENTIAL EQUATIONS WITH FINITE ELEMENTS	20
MA4022	DATA MINING AND NEURAL NETWORKS*	20
MA4061	TOPICS IN MATHEMATICAL BIOLOGY*	20
MA4702	READING IN MATHEMATICS^^	20
	Semester Total	60

**At least 120 credits of the modules taken in years 3 and 4 must be at Level 4.
^MA3513 may not be taken in conjunction with MA3511.
^^ MA4701 and MA4702 may not both be taken.

+Not more than 20 credits of Computer Science options can be selected across the year.

FOURTH YEAR MODULES

MMath Mathematics/MMath Mathematics (USA)

SEMESTER 1

Core Modules Credits

MA4504	MATHEMATICS PROJECT (TAKEN OVER BOTH SEMESTERS)	20

Optional Modules: Two selected from:

MA3012	SCIENTIFIC COMPUTING	20

MA3071	FINANCIAL MATHEMATICS 1	20
MA3074	INTRODUCTION TO ACTUARIAL MATHEMATICS	20
MA3152	CURVES AND SURFACES	20
MA3002	EQUATIONS OF MATHEMATICAL PHYSICS	20
MA3077	OPERATIONAL RESEARCH	20
MA4142	REPRESENTATION THEORY OF FINITE GROUPS	20
MA4080	MATHEMATICAL MODELLING	20
MA4701	ADVANCED READINGS IN MATHEMATICS*	20
	Semester Total	60

Up to 20 credits may be substituted from Level 2 and Level 3 Computer Science options by negotiation with the Head of Department+

SEMESTER 2

Core Modules		Credits
MA4504	MATHEMATICS PROJECT (TAKEN OVER BOTH SEMESTERS)	20
Optional Modules: Two selected from:		
MA3121	COMPLEX ANALYSIS	20
MA3511	COMMUNICATING MATHEMATICS	20
MA3101	SQUARING THE CIRCLE AND IRREDUCIBLE POLYNOMIALS	20
MA3201	GENERALIZED LINEAR MODELS	20
MA3153	NUMBER THEORY	20
MD3002	MEDICAL STATISTICS	20
MA4011	COMPUTATIONAL PARTIAL DIFFERENTIAL EQUATIONS WITH FINITE ELEMENTS *	20
MA4022	DATA MINING AND NEURAL NETWORKS*	20
MA4702	ADVANCED READINGS IN MATHEMATICS	20
MA4072	FINANCIAL MATHS 2	20
MA4061	TOPICS IN MATHEMATICAL BIOLOGY*	20
MA4041	METHODS OF MOLECULAR SIMULATION	20
	Up to 20 credits may be substituted from Level 2 and Level 3 Computer Science options by negotiation with the Head of Department+	
	Semester Total	60

*At least 120 credits of the modules taken in years 3 and 4 must be at Level 4.
+Not more than 20 credits of Computer Science options can be selected across the year.

MA4701 and MA4702 cannot be taken in conjunction with each other.

Appendix 2: Module specifications

See module specification database http://www.le.ac.uk/sas/courses/documentation

Appendix 3: Skills matrix

Appendix 4: Foundation Year Programme Specification