Programme Specification[1]

1. Programme Title(s) and Code(s):

Programme Title	*UCAS Code*	*GU Code*
MSci in Mathematics and another subject		G101-2207H
MSci in Applied Mathematics and another subject	G120-2207H	
MSci in Pure Mathematics and another subject	G110-2207H	

2. Academic Session:

2016-17

3. SCQF Level (see Scottish Credit and Qualifications Framework Levels):

11

4. Credits:

600

5. Entrance Requirements:

Please refer to the current undergraduate prospectus at:
http://www.gla.ac.uk/undergraduate/prospectus/

6. ATAS Certificate Requirement (see Academic Technology Approval Scheme):

ATAS Certificate not required

7. Attendance Type:

Full Time

8. Programme Aims:

After thousands of years mathematics is highly developed, yet continually growing, providing new insights and applications. The University of Glasgow offers courses, taught by experts, across a wide range and in depth. Not only is mathematics the medium for expressing knowledge about many physical phenomena, it is concerned with patterns, systems and structures unbound by any

[1] 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 full advantage is taken of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each course can be found in course handbooks and other programme documentation and online at www.gla.ac.uk

The accuracy of the information in this document is reviewed periodically by the University and may be checked by the Quality Assurance Agency for Higher Education.

specific application. It is characterised by rigorous logical, often ingenious, argument, gaining clarity and generality through abstraction. Many of its conclusions are striking and powerful. M.Sci. students should develop a mature understanding of fundamental theories and analytical skills applicable in many situations.

More detailed aims of the Combined M.Sci. are as follows.

- To promote understanding of mathematical theory. Because of the nature of the subject, the major part of an undergraduate programme is the presentation of established theory and techniques from which deductions and applications can be made.
- To provide training in problem solving. Consolidation of understanding is accomplished through the formulation and solution of problems. Students are expected to gain facility in this exercise through practice. Tutorials are provided as an aid.
- To develop independent learning ability and presentational skills. At this level students, under guidance, are expected to digest and master material in books and articles. Students will be expected to select and organise material and present it both orally and in writing. In their final year, they will prepare a major project (which may be on a topic in the other subject of the Combination).
- To be able to apply mathematical depth and rigour to other disciplines. This is particularly relevant to Combined degrees.
- To prepare students for research-based activity involving mathematics. Although original work will not normally be expected in the mathematical component, students will be brought to the threshold of research work. In additional a project in the combined area may already involve research-level activity.
- To foster employability across a wide range of significant vocations and careers. Through skills gained, students will be equipped to progress to many positions, some of which may not explicitly involve mathematics.

9. Intended Learning Outcomes of Programme:

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

By the end of this programme students will be able to

- display a sound understanding of the framework of mathematics
- apply the principles and techniques of mathematics to solve a wide range of mathematical problems both similar to previously worked examples or unseen
- display a broad and critical understanding of the nature of proof and what constitutes a proof
- present and write articles involving the fundamental concepts, principles, theories and methods of mathematics
- take problems expressed orally and verbally, reformulate them within the framework of mathematics, solve them using the tools of mathematics and communicate their solutions in oral and verbal form.
- become familiar with research themes within mathematics.

Skills and Other Attributes

Subject-specific/practical skills

On completion of the programme, students will be able to

- reproduce key mathematical definitions, theorems and their proofs and adapt such material to specific or modified situations
- appreciate how to proceed to impose pattern and structure on complex information by association with how this is achieved in the development of mathematics.

- make appropriate use of the tools of mathematics to solve real problems, obtaining arithmetically correct results by means of scientific calculators in simple cases and mathematical software packages or a programming language for more complex problems
- make appropriate use of ICT facilities, including specialist text/word processing and mathematical software packages
- apply the concepts and techniques of mathematics to other disciplines
- work independently on a major project but with the support of an experienced supervisor
- analyse original articles in their chosen speciality of mathematics.

Intellectual skills

On completion of the programme, students will be able to

- analyse and construct rigorous logical arguments
- apply the principles of mathematics to evaluate complex logical arguments, in particular those involving abstract concepts
- take a problem for investigation, identify the important features of the problem and construct a framework to capture these features within a mathematical model.
- select and apply appropriate mathematical methods and tools to solve the equations arising in the mathematical model, and be aware of the assumptions made and the limitations that these assumptions impose on the usefulness of the solution obtained.
- interpret the results of the mathematical analysis with the intention of accepting these results or further refining the mathematical model to incorporate further realism within the model, as appropriate
- plan and execute a mathematical investigation independently
- evaluate critically published research in a specialism of mathematics

Transferable/key skills

On completion of the programme, students will be able to

- think logically and analytically in concrete and abstract situations
- adapt theory according to particular circumstances
- adopt a structured approach to problem solving
- apply the techniques and structured procedures of mathematics to solve problems in other disciplines
- assess critically numerical and graphical information
- make efficient use of computers for analysing and presenting information
- communicate clearly and appropriately, both in writing and orally
- work independently, with the support of experienced supervisors available.
- work effectively with others in a group or team setting
- manage time and meet deadlines
- be self-aware and self-critical and understand education as a life-long process to adopt a rational and critical approach to choice and decision-making, based on research and evidence-gathering
- embark on research in mathematics with a clear focus on the speciality to be pursued.

10. Typical Learning and Teaching Approaches:

At Levels 3, 4 and 5 every lecture course has a credit value of either 10 or 20 credits. Each 10 credit course involves 17 lectures and 5 tutorials during the semester except for Writing and Presenting Mathematics, which has a unique structure. Each 10 credit course involves 17 lectures and 5 tutorials during the semester. 20 credit courses have 34 lectures and 10 tutorials during the semester.

Project Work: Students undertake a compulsory project, worth 20 credits, in their Level 4 year and a compulsory project in their Level 5 year. Both projects are individual work contributing to their final mark

11. Typical Assessment Methods:

Is examined in unseen degree examinations, held in the April/May diet.

Project Work: level 4 honours students undertake a compulsory project in their fourth year. The level 5 project is taken in the student's final year. This is individual work and contributes to their final mark. The level 4 project is worth 20 credits. The level 5 project is considered the equivalent of three degree examination papers.

12. Programme Structure and Features:

Entry into Combined M.Sci. Mathematics is in Year 3. The programme for Years 1 and 2 is the same as for B.Sc. Honours in Mathematics.

Year	Courses	Total Credits	Mathematics requirements for continuation
1	Year 1 - Mathematics (1R (20 credits) Maths1001 or 1X (20 credits) Maths 1004) and (1S (20 credits) Maths 1002 or 1Y (20 credits) Maths 1005) and Mathematical Skills test (zero credits) Maths1006	40 credits (Maths) & 80 credits (other courses) Total = 120 credits	Grade D3 or better in each Pass in Mathematical Skills test.
2	Mathematics Mathematics courses 2A (10 credits) Maths2001 2B (10 credits) Maths2004 2C (10 credits) Maths2005 2D (10 credits) Maths2006 2E (10 credits) Maths2007 2F (10 credits) Maths2008	30 credits per semester 60 credits (Maths) & 60 credits (other courses) Total = 120 credits	Grade C in each with a grade point average of at least 15 in these six courses.
3	(M) Analysis of Differentiation & Integration (10 credits) Maths4073 (P) Metric Spaces & Basic Topology (20 credits) Maths4077 (M) Mathematical Methods (20 credits) Maths4075 (M) Methods of Complex Analysis (10 credits) Maths4076 (P) Algebra (20 credits) Maths4072 (A) Modelling of Rigid & Deformable Bodies (20 credits) Maths4078 (D) Dynamical Systems (10 credits) Maths4074	60 credits (Maths) & 60 credits (Combination subject) Total = 120 credits	Grade B or better overall

4	If project is in Mathematics: Semester 1: 20 credits + 20 credit project & Semester 2: 20 credits or Semester 1: 10 credits + 20 credit project & Semester 2: 30 credits If project is not in Mathematics: a total of 60 credits with: Semester 1: minimum of 20 credits, maximum 40 credits Semester 2: minimum of 20 credits, maximum 40 credits (P) Differential Geometry (20 credits) Maths4101 (P) Topics in Algebra (10 credits) Maths4111 (M) Number Theory (10 credits) Maths4108 (M) Numerical Methods (20 credits) Maths4109 (M) Probability (10 credits) Stats4060 (M) Project (20 credits) Maths4061P (A) Fluid Mechanics (10 credits) Maths4102 (A) Partial Differential Equations (20 credits) Maths4110 (P) Functional Analysis (20 credits) Maths4103 (P) Galois Theory (10 credits) Maths4105 (P) Algebraic and Geometric Topology (20 credits) Maths4112 (M) Financial Statistics (10 credits) Stats4010 (M) Further Complex Analysis (10 credits) Maths4104 (A) Continuum Mechanics & Elasticity (20 credits) Maths4100 (A) Mathematical Physics (10 credits) Maths4107 (A) Mathematical Biology (20 credits) Maths4106	60 credits (Maths) & 60 credits (Combination subject) Total = 120 credits	Grade B or better overall in Year 4
5	Depending on the combination subject these arrangements will apply. Either 40 credits (Maths), 40 credits (other subject) and 40 (project). Or 60 credits (Maths), 20 credits (other subject) and 40 (project) Or 20 credits (Maths), 60 credits (other subject) and 40 (project) M Level project in either Mathematics or combination subject or both (topic to be approved by both subjects) 80 credits of courses and 40 credit project. All 5M courses are 20 credits. Courses offered in a particular session depends on student demand.	Total = 120 credits	

	List of all available courses (P) 5M: Advanced Differential Geometry And Topology Maths5039 (P) 5M: Advanced Functional Analysis (SMSTC) Maths5040 (A) 5M: Advanced Methods In Differential Equations Maths5041 (A) 5M: Advanced Numerical Methods Maths5042 (P) 5M: Advanced Algebraic And Geometric Topology Maths5038 (A) 5M: Applied Mathematical Methods (SMSTC) Maths5043 (A) 5M: Biological And Physiological Fluid Dynamics Maths5044 (P) 5M: Category Theory Maths5079 (P) 5M: Commutative Algebra And Algebraic Geometry Maths5045 (A) 5M: Elasticity Maths5046 (P) 5M: Fourier Analysis Maths5047 (P) 5M: Further Topics In Group Theory Maths5048 (P) 5M: Lie Groups, Lie Algebras And Their Representations Maths5049 5M: MSci Project Maths5051P (A) 5M: Magnetohydrodynamics Maths5050 (P) 5M: Operator Algebras Maths5052 (A) 5M: Solitons Maths5053 (A) 5M: Special Relativity And Classical Field Theory Maths5054		

Regulations
This programme will be governed by the relevant regulations published in the University Calendar. These regulations include the requirements in relation to:

(a) Award of the degree
(b) Progress
(c) Early exit awards
(d) (For undergraduate programmes, where appropriate) Entry to Honours

http://www.gla.ac.uk/services/senateoffice/calendar/

13. Programme Accredited By:

14. Location(s):

Glasgow

15. College:

College of Science and Engineering

16. Lead School/Institute:

Mathematics and Statistics [REG30500000]

17. Is this programme collaborative with another institution:

Select...

18. Awarding Institution(s):

University of Glasgow

19. Teaching Institution(s):

20. Language of Instruction:

English

21. Language of Assessment:

English

22. Relevant QAA Subject Benchmark Statements (see Quality Assurance Agency for Higher Education) and Other External or Internal Reference Points:

See QAA subject benchmark statement at :
http://www.qaa.ac.uk/academicinfrastructure/benchmark/honours/mathematics.pdf

23. Additional Relevant Information (if applicable):

Support for students is provided by the Postgraduate/Undergraduate Adviser(s) of Studies supported by University resources such as the Student Learning Service (www.gla.ac.uk/services/sls/), Counselling & Psychological Services (www.gla.ac.uk/services/counselling/), the Disability Service (www.gla.ac.uk/services/studentdisability/) and the Careers Service (www.gla.ac.uk/services/careers/).

IT facilities

Students are expected to carry out a variety of tasks using computers (eg the word processing of reports or essays) and Mathematics prefer to keep in contact with students via email. Students in Mathematics have a dedicated computer lab, equipped with 80 PCs.

Feedback from students

Each Mathematics class elects at least one of its members to represent it on School Staff-Student Committee. This is a forum in which student representatives may obtain further information about administrative matters, raise complaints and suggest improvements to their Mathematics courses. Two undergraduate students representatives are invited to attend meetings of Mathematics Learning and Teaching Committee where they may comment on any matter under discussion or, indeed, raise matters that they would like to have discussed. Student representation on other University committees and bodies (such as Senate) is the responsibility of the Students' Representative Council (SRC).

24. Date of approval:	