PROGRAMME SPECIFICATION	

1	**Awarding Institution**	Newcastle University
2	**Teaching Institution**	Newcastle University
3	**Final Award**	MMath Honours or MMathStat Honours
4	**Programme Title**	G103 Mathematics GGC3 Mathematics and Statistics
5	**UCAS/Programme Code**	See 4.
6	**Programme Accreditation**	GGC3 Mathematics and Statistics Accredited by Royal Statistical Society
7	**QAA Subject Benchmark(s)**	Mathematics, Statistics and Operational Research
8	**FHEQ Level**	7
9	**Date written/revised**	April 2011

10 Programme Aims

1 The two programmes aim to provide an in-depth understanding of mathematics and statistics for those who wish to enhance their employability by acquiring greater technical skills than those provided by the BSc programme, or who may wish to proceed to postgraduate study.

2 The structure aims to produce graduates who have a sound, broad knowledge of the fundamental aspects of mathematics and statistics, complemented by a knowledge of specialist areas, and an awareness of applications of these subjects.

3 The structure aims to develop students' ability to reason logically and their capacity for mathematical and statistical thinking, and to equip students with a range of subject-related key skills.

11 Learning 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 benchmark statements for Mathematics, Statistics and Operational Research.

Knowledge and Understanding

On completing the programme students should have:

A1 A broad understanding of fundamental concepts and methods of mathematics and statistics.

A2 Further knowledge and experience of theoretical concepts and analytical techniques in mathematics and statistics.

A3 In areas of the student's specialization, a more in-depth understanding of mathematical and/or statistical concepts and methods.

Teaching and Learning Methods

Lectures are the principal vehicle for presenting the essential material which defines the module, and provide the key element towards achieving the learning outcomes A1-A3. Problem classes are used to support lecture and enhance students' understanding by providing an opportunity to clarify issues arising from lectures and work through additional examples. In Stage 1, the module MAS1041 includes regular seminars where students present solutions to mathematical problems.

Assessment Strategy

The standard assessment format, used for nearly all modules, is based on an unseen written examination (counting for at least 70% of the assessment), together with an appropriate mixture of course assignments, in-course tests and mini-projects. These methods all enable assessment of the Learning Outcomes A1-A3. Assessment by unseen examinations is seen as a valid and reliable method of assessing both ability and knowledge. Details of the specific

assessment modes and weightings, for each module, are set out in the module specification in the Degree Programme Handbooks.

In Stages 2 and 3, we use a standard format for examination papers in which there is a Section A, consisting of short, straightforward questions which cover the whole module, and a Section B, with longer questions designed to test a greater depth of understanding. In Stage 1, we set a variety of short and medium length questions enabling the students to demonstrate their knowledge of the subject unconstrained by the need to answer complete long questions.

In Stage 4, assessment is more varied. There is a major project which is assessed by a dissertation, oral presentation and poster presentation.

Intellectual Skills

On successful completion of the programme students should be able to:

B1 Formulate problems.
B2 Prove results by following a sequence of logical steps.
B3 Solve problems.
B4 Present data in an understandable way.
B5 Interpret data

Teaching and Learning Methods

Regular drop-in sessions are used in all stages to give students the opportunity to ask individual questions about exercises and to clarify issues arising from lectures. This helps with learning outcomes B1-B3 in most mathematics modules and with B4 and B5 in most statistics modules.

Assessment Strategy

Homework assignments are designed to allow students to test and develop these intellectual skills. The assignments are set weekly (20 credit modules) or fortnightly (10 credit modules) basis in Stage 2 and 3. In Stage 1 modules there are normally four coursework assessments per Semester and there is significant use of computer based assessment (CBA). Model solutions to all homework exercises are made available to students when the marked work is returned, sometimes earlier if appropriate. Marked work is returned within two weeks of the submission date. Computer based assignments are used in Stage 1 and, to a lesser extent, in Stage 2 to help the students to develop their problem solving skills (B3). The students are given access to try questions in CBA practice mode and then a fixed period to attempt randomly generated questions in 'exam' mode. Having completed an assignment, they are given their marks and the full solutions. In-course tests are used in some Stage 2 and 3 modules to give students practise in problem solving under exam-like conditions (B3). All three forms of assessment contribute to both formative and summative assessment.

Practical Skills

On successful completion of the programme students should be able to:

C1 Use the mathematical programme Maple to solve various mathematical problems.
C2 Use the statistical programming language R to solve various statistical problems.

Teaching and Learning Methods

Practical classes, held in a computer teaching laboratory, introduce students to the use of computer packages (Maple and R). At Stage 1, Mathematics modules have classes involving the computer algebra package Maple (B1) and in Statistics modules students learn how to use R for data analysis and simulation studies (B2). In later stages, students are expected to use the computer network, as appropriate, for homework assignments or minor projects. Such work often starts in a practical session and is finished in the student's own time.

Assessment Strategy

Computing skills are assessed through mini projects or through questions in homework assignments.

Transferable/Key Skills

On successful completion of the programme students should be able to:

D1 Write project reports using Word.
D2 Demonstrate a high level of numeracy.
D3 Demonstrate a high level of computer literacy.

D4 Manage time and prioritise tasks by working to strict deadlines.
D5 Communicate effectively to others, orally and in poster format.
D6 Take responsibility for his/her own learning.
D7 Give a presentation.
D8 Work in a team.

Teaching and Learning Methods

Students learning is supported by weekly or fortnightly exercises (D2 and D3). Project work is normally started within Practical sessions (D1 and D3). Further support is given in drop-in sessions (D2). Short presentations in Stage 1 introduce presentations skills (D7). The project module in Stage 3 develops higher level presentational skills and provides an environment for group work (D7 and D8).
Lectures within the project modules discuss how to give oral and poster presentations and how to use LateX (D5 and D6). Weekly supervisory meetings with the Stage 4 project students allows progress to be monitored (D4 and D5).

Assessment Strategy

Many statistics modules and some mathematical modules have a project element (D1 and D3). Most modules involve exercises which improve numeracy (D2).
All modules have exercises/projects with strict deadlines (D4). Oral and poster presentations count towards the assessment of the Stage 4 project (D5).

12 Programme Curriculum, Structure and Features

Basic structure of the programme

These degree programmes last three years and comprise of 360 credits spread equally over the three stages. In **Stage 1**, the School aims first to consolidate and reinforce the students' knowledge on entry, and to provide a sound body of introductory material in mathematical methods and in the three subject areas of Applied Mathematics, Pure Mathematics and Statistics. This provides the foundation for subsequent study in these areas. Students also take a module that reinforces work in other modules and provides an opportunity to give a short presentation. This comprises 90 credits of compulsory material.

For the remaining 30 credits in Stage 1, students either take optional modules in the School (which are designed to consolidate the content of the compulsory modules with a computational bias) or study modules outside the School (which enables them to broaden their experience) or take a mixture of the two. The modules outside the School are chosen freely, subject to the timetable; in practice, modules in Computing, Accounting or Business are most frequently chosen.

In **Stage 2**, all students undertake further compulsory study in each of Applied Mathematics, Pure Mathematics and Statistics. These modules develop relevant knowledge and experience of more theoretical concepts and further analytical techniques. This consists of 60 credits in total.

In addition, in Stage 2, students normally take further modules in each of the three subject areas. However they may elect to replace up to 20 credits by further modules offered elsewhere in the University at the appropriate level, in order to broaden their knowledge and skills.

In **Stage 3**, a wide choice of modules is provided, extending over the three subject areas. This allows students either to specialise or to continue to study a broad curriculum. There is also a further opportunity to take modules from outside the School (up to 20 credits) at the appropriate level.

Choice of modules at Stage 3 is affected by what a student intends to take in Stage 4.

In Stage 4 students are required to study advanced modules which are intended to take the students closer to the frontiers of research. They also undertake a substantial project in their chosen subject area which develops their skills of independent study and presentation of results both orally and in writing.

Key features of the programme (including what makes the programme distinctive)

A distinctive feature of the School's curriculum is the flexible structure, operating within the University's modular system, in which students can choose pathways which provide either:

a) a broad mathematical and statistical education throughout their programme of study, or

b) a general mathematical and statistical background followed by more specialised study of chosen areas.

The balance of modules chosen by a student, through optional choices in Stages 2, 3 and 4 is reflected in the degree title awarded.

The Master of Mathematics and Statistics degree is unconditionally accredited by the Royal Statistical Society.

Programme regulations (link to on-line version)

http://www.ncl.ac.uk/regulations/

13 Criteria for admission

Entry qualifications

Our standard offer is a grade A in 'A' level Mathematics with an A and B in two other 'A' levels. Corresponding offers are made to applicants taking other combinations of A and AS levels and other forms of UK or overseas exams.

Admissions policy/selection tools

An academic member of the admissions staff considers each application. Based on the information supplied, the staff member decides whether to offer the applicant a place and if so what the terms of the offer are to be.

Non-standard Entry Requirements

Mature students and those with non-standard qualifications are interviewed whenever this is practical (by telephone if necessary) before any offer is made.

Additional Requirements

While 'A' level Further Mathematics is not required, preference is given at confirmation to those who have studied it and who have attained a reasonable grade.

Level of English Language capability

The School uses the standard University entrance requirement (i.e. an IELTS score of 6.5).

14 Support for Student Learning

Induction

During the first week of the first semester students attend an induction programme. New students will be given a general introduction to University life and the University's principle support services and general information about the School and the programme offered, as described in the Degree Programme Handbook. New and continuing students will be given detailed programme information and the timetable of lectures/practicals/problem classes, etc. The International Office offers an additional induction programme for overseas students. Revision sessions on key material taught the previous year are provided for returning students.

Study skills support

Students will learn a range of Personal Transferable Skills, including Study Skills, as outlined in the Programme Specification. Guidance is given on study skills using the booklet "Winning at Mathematics" which is issued to all new students.

Help with academic writing is available from the Writing Centre.

Academic support
The initial point of contact for a student is with a lecturer or module leader, or with their personal tutor (see below) for more generic issues. Thereafter the Degree Programme Director or Head of School may be consulted. Issues relating to the programme may be raised at the Staff-Student Committee, and/or at the Board of Studies. The School organises meetings with students to discuss pre-registration for the following academic year.

Pastoral support
Each student is assigned a personal tutor whose responsibility is to monitor the academic performance and overall well-being of their tutees and the School has a Senior Tutor. In addition, the University offers a range of support services, including one-to-one counselling and guidance or group sessions/workshops on a range of topics, such as emotional issues eg. stress and anxiety, student finance and budgeting, disability matters, etc. There is specialist support available for students with dyslexia and mental health issues. Furthermore, the Union Society operates a Student Advice Centre, which can provide advocacy and support to students on a range of topics including housing, debt, legal issues, etc. The School has a member of the administrative staff designated to give pastoral support as needed.

Support for students with disabilities
The University's Disability Support Service provides help and advice for disabled students at the University - and those thinking of coming to Newcastle. It provides individuals with: advice about the University's facilities, services and the accessibility of campus; details about the technical support available; guidance in study skills and advice on financial support arrangements; a resources room with equipment and software to assist students in their studies. The School has a designated disability support staff member.

Learning resources
The University's main learning resources are provided by the Robinson and Walton Libraries (for books, journals, online resources), and Information Systems and Services, which supports campus-wide computing facilities.

All new students whose first language is not English are required to take an English Language Proficiency Test. This is administered by INTO Newcastle University Centre on behalf of Newcastle University. Where appropriate, in-sessional language training can be provided.

15 Methods for evaluating and improving the quality and standards of teaching and learning

Module reviews
All modules are subject to review by questionnaires which are considered by STLC and the Board of Studies. Changes to, or the introduction of new, modules are considered at the School Teaching and Learning Committee and at the Board of Studies. Student opinion is sought at the Staff-Student Committee and/or the Board of Studies. New modules and major changes to existing modules are subject to approval by the Faculty Teaching and Learning Committee.

Programme reviews
The Board of Studies conducts an Annual Monitoring and Review of the degree programme and reports to Faculty Teaching and Learning Committee.

External Examiner reports
External Examiner reports are considered by the Board of Studies. The Board responds to these reports through Faculty Teaching and Learning Committee. External Examiner reports are shared with institutional student representatives, through the Staff-Student Committee.

Student evaluations
All modules, and the degree programme, are subject to review by student questionnaires. Informal student evaluation is also obtained at the Staff-Student Committee, and the Board of

Studies. The National Student Survey is sent out every year to final-year undergraduate students, and consists of a set of questions seeking the students' views on the quality of the learning and teaching in their HEIs. With reference to the outcomes of the NSS and institutional student satisfaction surveys, actions are taken at all appropriate levels by the institution.

Mechanisms for gaining student feedback
Feedback is channelled via the Staff-Student Committee and the Board of Studies.

Faculty and University Review Mechanisms
The programme is subject to the University's Internal Subject Review process. Every five years degree programmes in each subject area receive a review. This involves both the detailed consideration of a range of documentation, and a two-day review visit by a review team which includes an external subject specialist in addition to University and Faculty representatives. Following the review a report is produced, which forms the basis for a decision by University Teaching and Learning Committee on whether the programmes reviewed should be re-approved for a further five year period. The School of Mathematics and Statistics was reviewed in 2006/7.

Accreditation reports
The Master of Mathematics and Statistics degree (GGC3) is accredited by the Royal Statistical Society. There are no visits or report associated with this accreditation.

Additional mechanisms
None.

16 Regulation of assessment

Pass mark
The pass mark is 40 (modules at levels 4, 5, 6) or 50 (modules at level 7). The minimum degree class awarded is Second Class, Second Division.

Course requirements
Progression is subject to the University's Integrated Masters Progress Regulations and Integrated Masters Examination Conventions. In summary, students must pass, or be deemed to have passed, 120 credits at each Stage. Limited compensation up to 40 credits and down to a mark of 35 is possible at each Stage and there are resit opportunities, with certain restrictions.

Weighting of stages
The marks from Stages 2, 3 and 4 will contribute to the final classification of the degree
The weighting of marks contributing to the degree for Stages 2, 3 and 4 is 1:2:3.

Common Marking Scheme
The University employs a common marking scheme, which is specified in the Undergraduate Examination Conventions, namely

	Modules used for degree classification (DC)	**Modules not used for degree classification**
<40	Fail*	Failing
40-49	Third Class*	Basic
50-59	Second Class, Second Division	Good
60-69	Second Class, First Division	Very Good
70+	First Class	Excellent

* For level 7 modules, a mark <50 is a Fail.

Role of the External Examiner

An External Examiner, a distinguished member of the subject community, is appointed by Faculty Teaching and Learning Committee, after recommendation from the Board of Studies. The External Examiner is expected to:

- See and approve examination papers
- Moderate examination and coursework marking
- Attend the Board of Examiners
- Report to the University on the standards of the programme

In addition, information relating to the programme is provided in:

The University Prospectus (see http://www.ncl.ac.uk/undergraduate/ or http://www.ncl.ac.uk/postgraduate/

The School Brochure (contact enquiries@ncl.ac.uk)

The University Regulations (see http://www.ncl.ac.uk/calendar/university.regs/)

The Degree Programme Handbook (see http://www.ncl.ac.uk/math/)

Please note. This specification provides a concise summary of the main features of the programme and of the learning outcomes that a typical student might reasonably be expected to achieve if she/he takes full advantage of the learning opportunities provided. The accuracy of the information contained is reviewed by the University and may be checked by the Quality Assurance Agency for Higher Education.

Annex

Mapping of Intended Learning Outcomes onto Curriculum/Modules

		Intended Learning Outcomes			
Module	**Type**	**A**	**B**	**C**	**D**
MAS1041	Core	1	1,3	1	2,4
MAS1042	Core	1	1,3	1	2,4
MAS1141	Core	1	1,3	1	2,3,4
MAS1142	Core	1	1,3	1	2,3,4
MAS1241	Core	1	1,2,3	1	2,4
MAS1242	Core	1	1,2,3	1	2,4
MAS1341	Core	1	1,3,4,5	2	1,2,3,4
MAS1342	Core	1	1,3,4,5	2	1,2,3,4
MAS1043		1	1,3	1	2,3,4,5
MAS1143		1	1,3	1	2,3,4
MAS1243		1	2,3	1	2,3,4
MAS1343		1	1,3,4,5	2	1,2,3,4
MAS2103		2	1,3		2,4
MAS2104	Compulsory	2	1,3		2,4
MAS2105	Compulsory	2	1,3	1	2,4
MAS2106		2	1,3		1,2,3,4
MAS2223	Compulsory	2	2,3		2,4
MAS2224	Compulsory	2	2,3		2,4
MAS2213		2	2,3		2,4
MAS2216		2	2,3	1	2,4
MAS2302		2	1,3,5	2	2,4
MAS2304	Compulsory	2	1,2,3	2	2,4
MAS2316	Compulsory	2	1,2,3		2,4
MAS2317		2	1,3,5	2	2,4
MAS3091	Compulsory	3	1,3,4,5		1,4,7,8
MAS3107		3	1,3		1,2,3,4
MAS3111		3	1,3		2,4
MAS3112		3	1,3	1	2,3,4
MAS3115		3	1,3		2,4
MAS3118		3	1,3		2,4
MAS3120		3	1,3		2,4
MAS3121		3	1,3		2,4
MAS3202		3	2		4
MAS3207		3	2		4
MAS3209		3	2		4
MAS3210		3	2		4
MAS3214		3	2		2,4
MAS3215		3	2		2,4
MAS3217		3	2		4
MAS3219		3	2		2,4
MAS3301		3	1,2,3,5	2	1,2,3,4
MAS3309		3	1,2,3,4,5	2	1,2,3,4
MAS3311		3	1,3,4,5	2	1,2,3,4
MAS3312		3	1,2,3		2,4
MAS3313		3	1,2,3,4,5	2	1,2,3,4
MAS3314		3	1,2,3,4,5	2	2,3,4
MAS8091	Compulsory	3	2,3		4,5,6
MAS8107		3	1,3		1,2,3,4
MAS8113		3	1,2,3		4
MAS8114		3	1,3		4
MAS8115		3	1,3		2,4
MAS8121		3	1,3		2,4

MAS8120		3	1,3		2,4
MAS8201		3	2		4
MAS8202		3	2		4
MAS8214		3	2		2,4
MAS8217		3	2		4
MAS8219		3	2		2,4
MAS8303		3	1,2,3,5	2	1,2,3,4
MAS8304		3	1,2,3		2,4
MAS8311		3	1,2,3,4,5	2	1,2,3,4
MAS8312		3	1,2,3		2
MAS8314		3	1,2,3,4,5	2	1,2,3
MAS8391	Compulsory (GGC3)	3	2,3		4,5,6