

PROGRAMME SPECIFICATION

1	Awarding Institution	Newcastle University
2	Teaching Institution	Newcastle University
3	Final Award	BSc (Hons)
4	Programme Title	G100 Mathematics GG13 Mathematics and Statistics G300 Statistics G10X Mathematics with Placement Year GG1X Mathematics and Statistics with Placement Year G30X Statistics with Placement Year
5	UCAS/Programme Code	See 4.
6	Programme Accreditation	Institute of Mathematics and its Applications
7	QAA Subject Benchmark(s)	Mathematics, Statistics and Operational Research
8	FHEQ Level	6
9	Date written/revised	July 2021

10 Programme Aims

- 1 To provide an integrated but flexible degree structure, enabling each student to choose either broad or more specialist study.
- 2 The structure aims to produce graduates who have a sound, broad knowledge of the fundamental aspects of mathematics and statistics, complemented by knowledge of specialist areas, and an awareness of applications of these subjects.
- 3 The programme allows students to develop the ability to reason logically and their capacity for mathematical and statistical thinking, and to equip students with a range of subject-related key skills.
- 4 For those students taking a programme with industrial placement, to provide students with a period of practical experience and the opportunity to develop their work place skills.

For students on the Placement Year programme:

- 5 Provide students with the experience of seeking and securing a position with an employer.
- 6 Facilitate independent self-management and proactive interaction in a non-university setting.
- 7 Provide a period of practical work experience that will benefit current academic study and longer term career plans.
- 8 Enable students to ethically apply their knowledge and skills in the work place, reflect upon their development and effectively evidence and articulate their learning in relevant future settings.

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 and Statistics.

Knowledge and Understanding

On successful completion of 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 Further broad knowledge of a number of topics in mathematics and statistics or a more specialist knowledge of particular areas within these subjects, as appropriate to the pathway chosen and as reflected in the degree title awarded.

For students on the Placement Year programme:

- A5 Apply personal and professional development strategies to prioritise, plan, and manage their own skills development and learning.
- A6 Research, select and apply relevant knowledge aimed at enhancing their own skills and effectiveness in specific duties at their placement.
- A7 Demonstrate an understanding of a work environment, how it functions and their contribution to it.
- A8 Relate their work based learning to other areas of personal development, including academic performance.

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 lectures and enhance students' understanding by providing an opportunity to clarify issues arising from lectures and work through additional examples. In Stage 1, there is a module that includes regular seminars where students present solutions to mathematical problems.

There are two 10 credit problem solving modules in Stage 1, and three 10 credit modules in Stage 2 that involve significant elements of group learning.

Assessment Strategy

The standard assessment format, used for most 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 Module Catalogue.

In Stages 2 and 3 modules assessed mainly by examination, 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.

The modules that incorporate group learning are largely assessed by coursework (a combination of in-course tests, presentations, projects, as appropriate to the module).

Intellectual Skills

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

- B1 Formulate problems.

<p>B2 Prove results by following a sequence of logical steps. B3 Solve problems. B4 Present data in an understandable way. B5 Interpret data</p>
<p>Teaching and Learning Methods</p> <p>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.</p>
<p>Assessment Strategy</p> <p>In-course tests and coursework assignments are designed to allow students to test and develop these intellectual skills. Typically there are three or four assessments in a 10 credit module: a combination of in-course tests, written assignments, mini-project and computer based assessments (CBAs), as appropriate to the module. Stage 1 modules usually have five assessments. Model solutions to all written assignments 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 assessments 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 give students practice in problem solving under exam-like conditions (B3). All forms of in-course assessment contribute to both formative and summative assessment.</p>
<p>Practical Skills</p> <p>On successful completion of the programme students should be able to: C1 Use the mathematical programme Python to solve various mathematical problems. C2 Use the statistical programming language R to solve various statistical problems.</p>
<p>Teaching and Learning Methods</p> <p>Practical classes, held in a computer teaching laboratory, introduce students to the use of computer packages (R and Python).</p> <p>These packages will be met in Stage 1 problem solving modules, with further development in a Stage 2 computing module (C1, C2). 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.</p>
<p>Assessment Strategy</p> <p>Computing skills are assessed through tests and mini projects or through questions in coursework assignments. (C1, C2)</p>
<p>Transferable/Key Skills</p> <p>On successful completion of the programme students should be able to:</p> <p>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 orally and in written form in English. D6 Work in a team. D7 Write reports in LaTeX.</p> <p>For students on the Placement Year programme: D8 Reflect on and manage own learning and development within the workplace. D9 Use existing and new knowledge to enhance personal performance in a workplace environment, evaluate the impact and communicate this process. D10 Use graduate skills in a professional manner in a workplace environment, evaluate the impact and communicate the personal development that has taken place.</p>

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 (D5).

The problem solving modules in Stage 1 involve presentational skills and group work (D5, D6). A key skills/careers management module includes report writing in LaTeX and computer literacy (D1, D3, D5, D7). The group project module in Stage 2 develops higher level presentational skills and provides an environment for group work (D5 and D6).

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).

12 Programme Curriculum, Structure and Features

Basic structure of the programme

The programmes without a placement year last three years and comprise 360 credits spread equally over the three Stages.

The programmes with a placement year last four years and comprise 360 credits spread equally over three Stages together with the placement year. Students are not admitted to a programme with a placement year, but may transfer early in Semester 2 of Stage 2, subject to approval by the Degree Programme Director.

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 without emphasising boundaries between the subject areas. This provides the foundation for subsequent study in these areas. Students also take problem solving modules that introduce the computing packages Python and R and provide opportunities for teamwork and presentations. This comprises 100 credits of compulsory material.

For the remaining 20 credits in Stage 1, students either take optional modules in the School 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. These modules have a weight of 90 credits in all programmes. Students also take a compulsory 10 credit module in computing relevant to Mathematics and Statistics. Most students will take a Mathematical Skills and Career Management module and a Group Project module. These may be replaced by up to 20 credits of modules offered elsewhere in the University at the appropriate level, provided that the alternative modules cover comparable 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.

Students on the Placement Year programme will be on placement year between Stages 2 and 3 of their programme.

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 broad mathematical and statistical education throughout their programme of study or
- 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 stage 2 and 3 is reflected in the degree title awarded.

Subject to approval, students may transfer to a programme including a placement year between stage 2 and 3.

Programme Regulations (line to on-line version)

- [G100 Mathematics](#)
- [G10X Mathematics with Placement Year](#)
- [GG13 Mathematics and Statistics](#)
- [GG1X Mathematics and Statistics with Placement Year](#)
- [G300 Statistics](#)
- [G30X Statistics with Placement Year](#)

13 Support for Student Learning

Generic information regarding University provision is available at the following link.

https://www.ncl.ac.uk/ltds/assets/documents/qsh_progspec_generic_info.pdf

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

Generic information regarding University provision is available at the following link.

https://www.ncl.ac.uk/ltds/assets/documents/qsh_progspec_generic_info.pdf

15 Regulation of assessment

Generic information regarding University provision is available at the following link.

https://www.ncl.ac.uk/ltds/assets/documents/qsh_progspec_generic_info.pdf

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

The University Prospectus: <http://www.ncl.ac.uk/undergraduate/degrees/#subject>

Degree Programme and University Regulations: <http://www.ncl.ac.uk/regulations/docs/>

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.