PROGRAMME SPECIFICATION	Newcastle University

1	**Awarding Institution**	Newcastle University
2	**Teaching Institution**	Newcastle University
3	**Final Award**	BSc (Hons)
4	**Programme Title**	G200 Data Science, 1908U Data Science with Study Abroad 1010U Data Science with Careers Placement Year
5	**UCAS/Programme Code**	See 4.
6	**Programme Accreditation**	Institute of Mathematics (G200 only)
7	**QAA Subject Benchmark(s)**	Mathematics, Statistics and Operational Research
8	**FHEQ Level**	Level 6
9	**Date written/revised**	May 2025

10   Programme Aims
The programme aims to:

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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 data science, complemented by knowledge of specialist areas, and an awareness of applications of these subjects.
3. To develop the multi-disciplinary skills essential to produce the trained experts in Data Science required by academia and industry.
4. To provide the fundamental computational knowledge and expertise required to tackle complex Data Science problems.

For students on the Careers 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 workplace, reflect upon their development and effectively evidence and articulate their learning in relevant future settings.

For students on the International Study Year programme:

9. Offer students the opportunity to develop graduate attributes which increase employability, particularly communication and (where applicable) language skills, intercultural competencies, adaptability, resilience and global awareness.
10. Gain insight into international Higher Education and experience differences in academic approach and learning environment.
11. Provide the opportunity to experience new areas of study outside of their usual programme of study at Newcastle University.

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

A1.   A broad understanding of fundamental concepts in data science.
A2.   An understanding of data management, integration and handling.
A3.   A broad knowledge of the computational, mathematical and statistical methods for dealing with large and complex data analysis problems.
A4.   Knowledge of current tools and technologies pertaining to data science.
A5.   An understanding of the most used statistical algorithms, their underlying assumptions and limitations.
A6.   An understanding of the principles and theory which underlie data science, so that students can appreciate the current state of these subjects and can adapt to continued rapid developments through their subsequent careers.
A7.   An understanding of the principles of statistical modelling and inference so that students can tailor and adapt the ideas to address applied statistical problems through their subsequent academic study or careers.

For students on the Careers Placement Year programme:

A8   Apply personal and professional development strategies to prioritise, plan, and manage their own skills development and learning.
A9   Research, select and apply relevant knowledge aimed at enhancing their own skills and effectiveness in specific duties at their placement.
A10 Demonstrate an understanding of a work environment, how it functions and their contribution to it.
A11 Relate their work based learning to other areas of personal development, including academic performance.

For students on the International Study year programme:

A13.   The ability to adapt to different learning environments.

Teaching and Learning Methods

Fundamental and specialist knowledge (A1-A7) are imparted largely through direct student contact (lectures and tutorials), supplemented by practical sessions that may take the form of computing sessions, problem solving and assessed coursework, and project work.

Student understanding and learning is enhanced using computing and numerical exercises, problem solving, and practical work.

Adequate time is provided in all modules for private study for independent learning.

There are modules in stages 2 and 3 that involves significant group work.

Assessment Strategy

The standard assessment format is based on an unseen written examination, together with an appropriate mixture of course assignments, in-course tests and mini-projects integrated within the stage-level in-course assessment. These methods all enable assessment of the Learning Outcomes A1-A7.

Assessment by unseen examinations is seen as a valid and reliable method of assessing both ability and knowledge.

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

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.   Describe and explain the mathematical and statistical theory underpinning modern data science methods.
B5.   Apply their knowledge of specific computational, mathematical and statistical techniques to the storage and analysis of data.
B6.   Have expertise in the use and applicability of up-to-date programming languages and software tools.

Teaching and Learning Methods

Intellectual skills (B1-B6) are imparted by a combination of lectures, practical's, problem classes and case studies.

Tutorials are used to focus on problem solving exercises (B1-B4).

Practical classes help with learning outcomes B5-B6.

Assessment Strategy

Intellectual skills (B1-B5) are assessed through unseen exams and coursework assignments including practical write-ups. The assessment methods aim to evaluate the students' understanding and ability to apply the necessary mathematical, statistical and computational techniques.

The combination of practical-based in-course assessment along with unseen examination, ensures that learners are assessed on both their practical skills and theoretical knowledge of the subject discipline (B1-B6).

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). Having completed an assignment, they are given their marks and the full solutions, with the solutions forming a material part of the feedback and learning process for the student cohort.

All forms of in-course assessment contribute to both formative and summative assessment.

Practical Skills

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

C1.   Present, store and query data.
C2.   Apply methods to characterise and manipulate data sets for modelling and classification.
C3.   Use programming languages such as Python and R to solve various data science problems.
C4.   Apply appropriate statistical software to analyse data sets and interpret the results.
C5.   Effectively communicate insights derived from data sets and data models.

Teaching and Learning Methods

The ability to solve computational and statistical problems (C3-C4) will be acquired through practical sessions and self-directed learning.

Practical sessions will also help with learning outcomes C1-C2.

Problem solving exercises will be used to improve student skills in the application of appropriate computational and statistical methods to data handling and analysis (C1-C5).

Assessment Strategy

Practical skills (C1-C5) are primarily assessed continuously in the form of coursework assignments.

Transferable/Key Skills

On successful completion of the programme students should be able to:
D1.   Demonstrate written communication skills.
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.   Take responsibility for their own learning.
D6.   Work in a team.
D7.   Give an oral presentation.
D8.   Demonstrate problem solving skills.

For students on the Careers Placement Year Programme:

D9   Reflect on and manage own learning and development within the workplace.
D10   Use existing and new knowledge to enhance personal performance in a workplace environment, evaluate the impact and communicate this process.
D11   Use graduate skills in a professional manner in a workplace environment, evaluate the impact and communicate the personal development that has taken place.

For students on the International Study programme:

D12.   Adapt to and operate in a different cultural environment.

Teaching and Learning Methods

Students' learning is supported by regular exercises, typically on a fortnightly cycle (D2, D3, D4, D5, D8).

Project work is normally started within practical sessions (D1, D3). Further support is given in drop-in sessions (D2, D6).

The Frontiers in Data Science modules develop higher level presentational skills and provide an environment for group work (D1-D8).

Assessment Strategy

Oral communication skills (D7) are assessed in oral presentations.
Written communication skills (D1) are assessed by report preparation.
Problem solving skills (D8) are assessed through in course problem solving exercises and unseen exams.

12   Programme Curriculum, Structure and Features

Basic structure of the programme

The programme without a year abroad (G200) lasts three years and comprises 360 credits spread equally over the three stages.

The programme with a year abroad (1908U) lasts four years and comprises 360 credits spread equally over three stages together with year abroad. Students are not admitted to

the programme with a year abroad 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 computing modules that introduce the concepts of programming and data handling. This comprises 120 credits of compulsory material.

In stage 2, all students undertake further compulsory study in Mathematics, Statistics and Computing, including the practical-based Frontiers in Data Science module run by the National Innovation Centre for Data (NICD). These modules develop relevant knowledge and experience of more theoretical concepts and further analytical techniques. This comprises 100 credits of compulsory material. The remaining 20 credits is made up of optional modules from either a Pure Mathematics or an Applied Mathematics pathway.

In stage 3, in addition to 70 credits of compulsory modules, including a Data Innovation Bootcamp (run by NICD), a wide choice of optional modules is provided, extending over computing, mathematics and statistics. This allows students either to specialise or to continue to study a broad curriculum.

Students on the International Study programme and Careers Placement Programme will take their placement in the penultimate year of studies.

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

A distinctive feature of these programmes is their flexible structure, operating within the University's modular system in which students choose from a wide range of optional modules in later stages and can choose an area of specialisation. The choices available provide either a broad education in data science or a general data science background followed by more specialised study of chosen areas.

Opportunities are provided to undertake project work alongside NICD.

Subject to approval, students may transfer to a programme including a year abroad between Stage 2 and 3

Programme regulations (link to on-line version)

G200-1908U

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13   Support for Student Learning

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

Generic Information

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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.

Generic Information

Accreditation reports

Additional mechanisms

15	Regulation of assessment

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

Generic Information

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

The University Prospectus

Degree Programme and University Regulations

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.