

PROGRAMME SPECIFICATION (Undergraduate)	
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1	Awarding Institution	Newcastle University
2	Teaching Institution	Newcastle University
3	Final Award	BSc (Hons)
4	Programme Title	GG40 Computing and Mathematics 1985U Computing and Mathematics with Placement Year 1986U Computing and Mathematics with International Study Year
5	UCAS/Programme Code	GG40 1985U 1986U
6	Programme Accreditation	n/a
7	QAA Subject Benchmark(s)	Computing & Mathematics, Statistics and Operational Research
8	FHEQ Level	Level 6
9	Last updated	October 2025

10	Programme Aims	
1	To develop graduates equipped to tackle real-world problems and innovate for the future.	
2	To provide an integrated but flexible degree structure that enables students to choose either broad or more specialist study.	
3	The structure aims to produce graduates who have a sound, broad knowledge of the fundamental aspects of computer and mathematical sciences, complemented by knowledge of specialist areas, and an awareness of applications of these subjects.	
4	The programme allows students to develop the ability to reason logically, and their capacity for computing and mathematical thinking, and to equip students with a range of subject-related key skills.	
5	To provide a programme, informed by industry needs, that equips students with subject-specific and transferable skills that will enable them to pursue a variety of careers.	
6	To provide students with the opportunity to develop their skills within an industrial setting.	
	Programmes with Careers Placement:	
7.	Provide students with the experience of seeking and securing a position with an employer.	
8.	Facilitate independent self-management and proactive interaction in a non-university setting.	
9.	Provide a period of practical work experience that will benefit current academic study and longer term career plans.	
10.	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.	
	Programmes with International Study Year:	
11.	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.	

12. Gain insight into international Higher Education and experience differences in academic approach and learning environment.
13. 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 Computer Science and Mathematics.

Knowledge and Understanding

On completing the programme students should have and be able to demonstrate competency in:

- A1 A broad understanding of fundamental concepts and methods of mathematics and the theoretical and mathematical foundations of Computer Science.
- A2 An understanding of programming paradigms and languages supported by programming language principles.
- A3 Understand the principles of software engineering.
- A4 Further broad knowledge of a number of topics in mathematics or a more specialist knowledge of particular areas within these subjects
- A5 Techniques for the development of data representations and algorithms
- A6 The legal, ethical and social aspects of professional practice, personal development, social roles and effects of computing systems.
- A7 Know how to operate effectively in teams.
- A8 The principles of cybersecurity

For students on the Careers Placement Programme:

- A9 Apply personal and professional development strategies to prioritise, plan, and manage their own skills development and learning.
- A10 Research, select and apply relevant knowledge aimed at enhancing their own skills and effectiveness in specific duties at their placement.
- A11 Demonstrate an understanding of a work environment, how it functions and their contribution to it.
- A12 Relate their work-based learning to other areas of personal development, including academic performance.

For students on the International Study Year Programme:

- A13 Demonstrate the ability to adapt to different learning environments.

Teaching and Learning Methods

Lectures are the principal vehicle for presenting the essential materials which define the modules and provide a key element towards achieving the learning outcomes A1-A7. In mathematics, 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 Computing, practical classes feature prominently, (A2, A3) Visiting speakers provide seminars on aspects of being an IT professional (A7). Students are expected to contribute to their own learning experience by independent reading. Students are provided with references to books, categorised as essential, recommended or background reading, and scientific papers.

Assessment Strategy

The standard assessment format, used for most modules in mathematics, is based on an unseen written examination, normally representing the majority of the module mark, 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. 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 mathematics modules are 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 Computing at Stage 2 and 3 the modules are assessed by a combination of coursework and examination (as appropriate to the module). Modules include practical problem-solving exercises in practical classes, but these are not assessed. In Stage 1 mathematics modules, 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 1 Computing modules we assess via programming problem coursework where students create software artefacts. 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 completing the programme students should be able to:

- B1 Carry out the process of software development, including the analysis of requirements; the production of specifications; and robust, reliable, and secure software.
- B2 Demonstrate ability in several programming languages and paradigms.
- B3 Design useful and usable software.
- B4 Apply theoretical concepts in the design and analysis of software.
- B5 Formulate problems
- B6 Prove results by following a sequence of logical steps.
- B7 Recognise and solve abstract problems by the application of learned methodologies
- B8 Present and communicate data in an understandable way.
- B9 Apply critical thinking to the interpretation of data.

Teaching and Learning Methods

In computing, B1-B4 feature prominently in all modules. In this programme a team project at Stage 2 gives students experience of working with others (see D7 below) to engineer a complex piece of software (B2, B4). When taken, the industrial placement will require students to produce solutions to a customer's requirements (B1-B4). In all other modules, coursework is used to develop these skills (B1-B4).

In mathematics, regular drop-in sessions, and/or office hours, are used to give students the opportunity to ask individual questions about problem solving exercises and to clarify understanding following lectures. Regular drop-in sessions, office hours, and problem classes help with learning outcomes B5-B7 in most mathematics modules

Assessment Strategy

Subject-specific and professional skills in computing are assessed by coursework (B1-B4)

In mathematics modules, coursework assignments are designed to allow students to test and develop these intellectual skills. Typically, there are three assessments in a 10-credit module: a combination of in-course tests, written assignments, mini-project and computer-based assessments, as appropriate to the module. Model solutions to all written assignments are made available to students after the submission point has closed, with the solutions forming a material part of the feedback and learning process for the student cohort. Individual hand-marked work is typically returned within two weeks of the submission date, and marks for computer-based assignments marked by machine are released immediately. 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, students are given their marks and the full solutions. In Computing modules, coursework assignments require either a research or reflective report; or are practical in nature and involve the design, implementation, testing and

evaluation of a software solution or artefact. Assessments are designed to consolidate learning from lectures and practical exercises.
Practical Skills
On completing the programme students should be able to: C1 conduct investigations using the technical and professional literature. C2 use tools and techniques to support software development especially in teams. C3 address problems using theoretical analysis and empirical evaluation. C4 interacting with people to capture requirements and communicate the results. C5 produce technical documentation. C6 to use logical arguments to solve various mathematical problems.
Teaching and Learning Methods
All modules involve coursework, much of which involves problem solving skills (C4, C6). This is especially so in the team and individual coursework projects, and, when taken, the industrial placement, where students need to select, evaluate, and apply appropriate tools and techniques (C2). Here and elsewhere students will need to investigate possible alternatives in the technical and professional literature (C1, C3).
Assessment Strategy
Practical skills are assessed by a range of coursework (reports, design documents, software artefacts etc.) (C1-C6).
Transferable/Key Skills
On completing the programme students should be able to: D1 demonstrate a high level of numeracy (Math) D2 communicate effectively, within a team and with any stakeholders involved in their work using a wide range of media. D3 apply problem solving strategies and techniques to a range of tasks and scenarios D4 use their initiative to solve problems and manage their work D5 work in teams, fulfil team roles, plan and conduct a team project and evaluate their own and their teams' performance D6 be adaptable D7 plan and organise their work; manage time and prioritise tasks by working to strict deadlines D8 take responsibility for their own learning D9 present their work to a wide range of audiences For students on the Careers Placement programme: D10 Reflect on and manage own learning and development within the workplace. D11 Use existing and new knowledge to enhance personal performance in a workplace environment, evaluate the impact and communicate this process. D12 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 Year programme: D13 Adapt and operate in a different cultural environment
Teaching and Learning Methods
Key skills feature throughout the programme; teamwork, oral presentation, interpersonal communication, and planning and organisation in the Stage 2 and Stage 3 team project modules, (D3, D5); written communication in all modules, but especially in the team and final year projects (D1); problem solving, initiative and adaptability are necessarily covered throughout the programme (D3, D4, D6). Students learning is supported by regular mathematical exercises, typically on a fortnightly cycle (D1). Project work is normally started within practical sessions (D5) and further support is given in drop-in sessions (D1, D8). Lectures within the project modules are used to provide support on technical writing and presentation skills (D2, D8).

Assessment Strategy

Key (transferable) skills are assessed by both written and oral presentations (D1-D9).

Some statistics modules and some mathematical modules have a project element. Most modules involve exercises which improve numeracy and computer literacy (D1). All modules have exercises/projects with strict deadlines (D7). Oral presentations count towards the assessment of the Stage 2 group project (D2, D9)

12 Programme Curriculum, Structure and Features**Basic structure of the programme**

The programme lasts three years and comprises 360 credits spread equally over the three stages.

If undertaking a placement or study abroad year, the programme will last four years, still comprising 360 credits equally spread over 3 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, We aim first to consolidate and reinforce the students' knowledge on entry, and to provide a sound body of introductory material in mathematical methods and fundamental computing techniques 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 and attend practical classes to develop their problem solving and practical programming skills. This comprises 120 credits of compulsory material.

In Stage 2, all students undertake further compulsory study in Applied mathematics, algorithm design, introductory data science and security programming. These modules develop relevant knowledge and experience of more theoretical concepts and further analytical and practical techniques. Students also undertake the software engineering team project. This comprises 120 credits of compulsory material.

In Stage 3, a wide choice of modules is provided, extending over both computer science and mathematics 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 consolidate knowledge and skills in the final stage 3 group project.

For students on the Careers Placement Year, or the International Study Year programmes: Students will take their placements in the penultimate year of studies.

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

The programme includes a broad range of Mathematics and Computing topics at all stages and is flexible in terms of the number of specialised or broad pathways a student can select to follow depending on their requirements. The programme structure provides a lot of choice and allows students to refine their preferences throughout their learning journey rather than fix them in place at the outset for the duration of the course.

Programme regulations (link to on-line version)

[GG40 Computing and Mathematics](#)

[1985U Computing and Mathematics with Placement Year](#)

[1986U Computing and Mathematics with International Study Year](#)

13 Support for Student Learning

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

[Generic Information](#)

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

Degree Programme and University Regulations: [University Regulations | University Regulations | Newcastle University](#)

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.