Nottingham Trent University Course Specification

	Basic Course Information	
1.	Awarding Institution:	Nottingham Trent University
2.	School/Campus:	Science & Technology/Clifton Campus
3.	Final Award, Course Title and Modes of Study:	BSc (Hons) Computer Science and Mathematics FT BSc (Hons) Computer Science and Mathematics SW
4.	Normal Duration:	Full Time 3 years, Sandwich 4 years
5.	UCAS Code:	350Z/GG4C

6. Overview and general educational aims of the course

The BSc (Hons) Computer Science and Mathematics degree is designed to equip you with a broad based knowledge of mathematics and its applications, together with the knowledge and skills in computing necessary for a broad range of careers in commercial, technical, and scientific computing.

You will gain knowledge and understanding of a range of relevant mathematical and statistical techniques and their applications, and the ability to use specialised software to support your application of these techniques. Software design and implementation is a central theme of the course. The Computer Science and Mathematics degree will provide the specialist knowledge and skills necessary for careers in technically advanced fields of computing. The course will also equip you with general transferable skills, which will make you suitable for general graduate employment in a changing job market.

A placement year, usually salaried, is an important feature of the course. It is optional, but it can give you a distinct advantage in the job market on graduating. We have an experienced Placements Office to provide support in finding a placement that is right for you.

In summary, the course aims to:

- Equip you with the knowledge and skills necessary for a wide range of careers in commercial, technical and scientific computing.
- Develop knowledge and understanding of appropriate mathematics and statistics and the skills to apply this knowledge.
- Equip you with analytic problem solving skills and other transferable skills to prepare you for graduate employment in a wide range of careers.
- Provide you with sufficient specialised knowledge and the skills to enable you to pursue further study and research.

A version of this course is also offered with an integrated foundation year – BSc (Hons) Computer Science and Mathematics (with foundation year). See the course specification for the Foundation Year in Engineering and Mathematics.

7. **Course outcomes**

Course outcomes describe what you should know and be able to do by the end of your course if you take advantage of the opportunities for learning that we provide.

Knowledge and understanding

By the end of the course you should be able to:

K1. Demonstrate knowledge and understanding of a range of mathematical and statistical methods (M).

K2. Demonstrate knowledge and understanding of the fundamental characteristics of computer systems (C).

K3. Construct and analyse mathematical and statistical models of real-world phenomena, and assess their utility (M).

K4. Evaluate, select, and implement appropriate numerical techniques for a range of problems (M).

K5. Apply engineering principles (including analysis, design and evaluation) to the solution of practical computing problems (C).

K6. Demonstrate a good understanding of the theory underpinning computing skills (C).

Skills, qualities and attributes

By the end of the course you should be able to:

S1. Select, adapt and apply appropriate mathematical and statistical techniques to problems, and critically evaluate interpret the results (M).

S2. Select and apply appropriate analysis and design techniques to computing problems (C).

S3. Use professional mathematical and statistical software packages, and apply them to a range of problems.

S4. Program and implement computer systems using the tools of the computing professional (C).

S5. Construct mathematical arguments, identifying assumptions and conclusions (M).

S6. Gather, analyse and present technical and numerical information (C,M).

S7. Present arguments and conclusions accurately and clearly (C,M).

S8. Communicate effectively by report and presentation (C,M).

S9. Demonstrate a high level of IT competency and numeracy (C,M).

S10. Work effectively as part of a team, and work and learn independently (C,M).

(M) indicates that the outcome has been mapped to the Mathematics, Statistics and Operational Research benchmark standards. (C) indicates that the outcome has been mapped to the Computing benchmark standards. These benchmark standards provide a national framework for describing the content and standards of a Bachelor's degree with honours in mathematics and computing based disciplines.

8. **Teaching and Learning Methods**

The teaching and learning strategies for BSc (Hons) Computer Science and Mathematics have been developed to support your acquisition of knowledge, understanding, and skills in this specialised area, and have evolved over a number of years based on feedback, review and reflection. Autonomous learning is encouraged and motivated within the course by use of the following practices:

- Interaction with other students through small group based work.
- Presentation of ideas and findings to fellow students and tutors. This helps you to

organise your thoughts, and reflect on your understanding.

- Discussion of ideas with tutors. Self- and staff-directed investigation is important to the development of learning autonomy. This culminates in the final year Project where you will work on a topic chosen in consultation with your Project Supervisor, who will guide you in your work on the Project.
- The application of knowledge learned or taught within modules. The progression in the course from level to level ensures that earlier knowledge and skills are built on and developed.

The delivery of material is supported by strategies to encourage your consolidation and application of knowledge. To realise the course aims, the following practices will be adopted:

- Lectures to introduce and develop concepts and to explore the application of these concepts.
- Directed learning to supplement the development of concepts.
- Computer Workshops to develop skills and to underpin the lecture material with concrete learning experiences.
- Seminars to support the lecture programme and the consolidation and application phase of your learning process.
- Supervised project work to develop a deeper understanding of concepts and applications and to promote the development of personal skills.

The University runs an online resource to support teaching and learning, referred to as a Virtual Learning Environment and known as the NTU On-line Workspace (NOW). All modules are represented on NOW and most use it to provide you with learning material and news associated with the module or the course. The nature of the subject means that some of your learning can be directly computer-aided. To this end, NOW is a useful way of providing data-files, demonstrations, and macros/programs.

9. Assessment Methods

Modules are assessed either via coursework or exam, or a combination of both.

Coursework assessments can take many forms. You may be given a practical task to complete, which you then write up in a report. You may also have to demonstrate what you have done or give a presentation on what you have achieved. Some coursework assessments will involve working together in small groups. Coursework can also include the use of tests. Your final year Project will involve giving a presentation and writing a dissertation to demonstrate what you have achieved.

The range of assessment methods aims to give you a variety of ways in which to demonstrate achievement as well as encouraging the development of the time management and communication skills valued by employers.

10. Course structure and curriculum

The course is studied either Full Time over 3 years or over 4 years for the Sandwich mode. On the Sandwich route you will undertake a placement with a company between your second year and your final year. The placement will involve working for 9 months or more. In Full Time mode, you will go directly into the final year after your second year.

You will study a range of modules as indicated below. The Computer Science and Mathematics course develops your knowledge and skills along four themes that run through all levels of the course: mathematical methods; statistics; numerical methods; and software design. A further theme, starting in the second year, applies your mathematical and software development skills to Graphics.

In the first year of the course you will also study a module in Systems Analysis and Design, introducing you to key techniques and tools used to develop computer-based information systems within business organisations. In the final year, students will undertake a supervised Project, either in mathematics or computing.

You need to obtain 360 cps (credit points), 120 cps per year, to gain the honours qualification. Your final degree classification will be based on your year 2 mark (weighting 25%) and your final year mark (weighting 75%). Students who do not obtain enough credit points may be eligible for one of the following awards: Certificate of Higher Education (120 cps); Diploma of Higher Education (240 cps); or Ordinary degree (300 cps).

Successful completion of the year of industrial experience is necessary for you to gain the Sandwich award. For this, you will write a report detailing and evaluating the work you undertook and your part in the overall company context. You will also receive a Diploma in Professional Practice.

Year 1

Mathematical Methods	20cps
Data Analysis	20cps
Introduction to Numerical Methods	20cps
Foundations of Computing Technology and Programming	20cps
Introduction to Systems Analysis and Design	20cps
Computer Science Programming	20cps

Year 2

Differential Equations & Transform Methods	20cps
Probability and Statistical Inference	20cps
Numerical Methods for Ordinary Differential Equations	20cps

	Applied Mathematics and Graphics	20cps
	Software Design and Implementation	20cps
	Systems Software	20cps
Year 3		
	Industrial Placement year for Sandwich students	
Year 3/4		
	Project in Mathematics	20cps
	Graphics for Games & Dynamics Modelling	20cps
Choose one of the following two modules:		
	Statistical Modelling	20cps
	Linear Systems	20cps
Choose two of the following three modules:		
	Numerical Analysis & Dynamical Systems	20cps
	Applied Statistics	20cps
	Stochastic Processes	20cps
And choose one of the following three modules:		
	Advanced Analysis and Design	20cps
	Advanced Software Engineering	20cps
	Interaction Design and Project Management	20cps
Or		
	Project in Computing	40cps
	Graphics for Games & Dynamics Modelling	20cps
Choose one of the following two modules:		
	Statistical Modelling	20cps
	Linear Systems	20cps
Choose one of the following three modules:		
	Numerical Analysis & Dynamical Systems	20cps
	Applied Statistics	20cps
	Stochastic Processes	20cps
And choose one of the following three modules:		
	Advanced Analysis and Design	20cps
	Advanced Software Engineering	20cps
	Interaction Design and Project Management	20cps

11. Admission to the course

The admissions policy for this course is administered in accordance with the University regulations including a commitment to widening participation and equal opportunities.

For entry on to the GG4C Computer Science and Mathematics course you would normally be over 18 years of age and possess GCSE grade C or above in both Mathematics and English and 280 UCAS points at A2-level including grade B or above

in Mathematics A-level. It is preferred that your UCAS points come from a maximum of three A-levels or equivalent or a combination of two A-levels and two AS levels.

Equivalent UK and International qualifications are acceptable. The equivalence of these qualifications to the standard entry requirements are usually established with reference to the published UCAS Tariff (e.g. Irish leaving certificate, Scottish National Higher and International Baccalaureate), the information published by UCAS ("International Qualifications Guide" and "UCAS Admissions Guide and Decisions Processing Manual"), and the recommendations of UK Naric. OCN and Access HE qualifications may be acceptable if a sufficient number of level 3 units in Mathematics have been taken. Non-standard qualifications are referred to the admissions tutor for assessment.

If you wish to use Accreditation of Prior Experiential Learning (APEL) or Accreditation of Prior Certified Learning (APCL) for entry to this course, you will be assessed according to the standard procedures of the School of Science and Technology.

If you wish to use APEL for entry to the start of the course, or exceptionally, for advanced entry, you will be required to provide a detailed curriculum vitae outlining relevant experience. You will be asked to complete an appropriate assignment to enable you to demonstrate your learning for which equivalence is being claimed.

If you request APCL, you will be required to produce a transcript and details of the units/modules you have studied at your former institution to assist with the curriculum mapping process. This institution may be contacted before a final offer is made to confirm your suitability for the course of study.

If English is not your first language, you are expected to have a good command of spoken and written English. The minimum recommended requirement is the British Council IELTS grade 6.5 or CBTOEFL 213 or IBTOEFL 83 or TOEFL 550. Equivalent experience may include the successful completion of a non-UK degree in the English language or a significant period of residence/work placement in an English-speaking country, for which evidence should be provided. Where your ability to communicate in English is in doubt you may be asked to an interview.

Advanced entry would normally be into year 2 of the course, for which you would possess an appropriate qualification in Mathematics or an equivalent subject. This will normally be the completion of the first year of a University degree course elsewhere in the UK. In order to ensure potential applicants have suitable experience to enable them to successfully progress on to BSc (H) Computer Science and Mathematics, it is likely that the Admissions Tutor will request information about previous learning, for example transcripts and course content. Advanced entry into the final year may be

considered in exceptional circumstances (e.g., successful completion of a Bachelor's degree and relevant certified/experiential learning).

12. Support for Learning

There is an induction programme at the start of the first year. This gives an overview of the way the course runs and includes introductions to the IT and library resources. During induction you will receive a course handbook which contains the essential information about the course and the support we provide for your learning. You will also meet your Course Tutor and Year Tutor.

You are assigned a Course Tutor at the start of the course and regular meetings will take place throughout each year. Module Leaders, Year Tutors and a Course Manager oversee the smooth running of the course and they also serve as an additional source of support and advice for you.

Extensive online module information including learning materials is provided on the University Virtual Learning Environment, NOW. This also includes course information such as the course handbook and module specification documents. We have excellent computing facilities with some 24 hour availability for IT labs.

The school has a Student Information Desk for assessment hand-in and return, queries about fees, and other general queries.

If you decide to opt for the Sandwich award, the Mathematics Placements and Employability Tutor will work with you to develop your CV and will help you to target your applications so that you get a placement that is right for you. You will be assigned a visiting tutor who will visit you at the company.

In addition to the above support, the University Student Support Services can give you extensive support and advice on a range of issues, e.g. financial problems, dyslexia and disability, and personal problems.

13. Graduate destinations / employability

Graduate employability is fundamental to the strategic aims of Nottingham Trent University, as reflected by the fact that NTU is consistently placed close to the top of the league table of all UK Universities for graduate employment. Indeed 94% of our graduates* from full-time undergraduate courses are employed or engaged in further study six months after leaving (*of those available for work, HESA survey 2009/10).

The Computer Science and Mathematics course will equip you with the knowledge and skills required for employment in a broad range of mathematics and computing related fields. The software development skills you will develop - and your knowledge of mathematical, statistical and numerical methods - will equip you for a career in technical and scientific computing. These mathematical and computing skills, and the skills and knowledge of computer graphics that you will acquire will make you

particularly well-suited for the simulation industry and the games industry.

Graduates who choose to venture into other sectors will be equally successful in gaining employment because of the transferable skills developed on this course. Skills of numeracy and reasoning, together with the analytic approach to problem solving that you will acquire, are highly valued by employers.

As a graduate from this course, you will be equipped with the knowledge and skills needed to engage in further study in either mathematics or computing, either while at your place of employment (for professional and personal development) or at university (for a higher degree).

In addition to the expertise available within the School, the University has a comprehensive careers service open to all students to assist in securing employment (http://www.ntu.ac.uk/careers/).

14. Course standards and quality

All aspects of quality management within the School are in accordance with the University's Academic Standards and Quality Handbook. The Course Management Team, which includes the Course Manager and Module Leaders, oversees the operational arrangements for the Course. In addition, the Course Committee, central to which are the student representatives, meets regularly throughout the year to review, evaluate and develop the Course. Formal Course monitoring takes place at the end of each module through the administration of questionnaires offering closed and open ended questions, which is in addition to informal feedback received from students throughout the year.

Overarching responsibility for quality control lies with the School Academic Standards and Quality Committee whose remit is to provide guidance and support to academic Courses. External Examiners offer further quality control through monitoring academic standards, moderation of assessment tasks and processes. Feedback from the Course Committee and student evaluation at modular and course level inform the Course Standards and Quality Report (CSQR), which reviews and evaluates the student experience at course level. In turn the Course Standards and Quality Report informs the Schools Standards and Quality Report (SSQR) which is presented to the University as part of the institutions quality assurance and enhancement cycle.

15. Assessment regulations

This course is subject to the University's Common Assessment Regulations (located in its Academic Standards and Quality Handbook). Any course specific assessment features are described below:

There are no course specific exceptions from the University regulations.

16. Additional Information

Collaborative partner(s):	N/A
Course referenced to national QAA	Mathematics, Statistics and Operational

Benchmark Statements:	Research.
Course recognised by:	
Date implemented:	1st September 2015
Any additional information:	
Course specification updated:	September 2019