

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) Data Science FT BSc (Hons) Data Science SW
4.	Normal Duration:	Full Time 3 years, Sandwich 4 years
5.	UCAS Code:	7G73/7G74

6. Overview and general educational aims of the course

The BSc (Hons) Data Science degree is designed to equip you with a broad based knowledge of mathematics, statistics and their applications, together with cutting-edge knowledge and skills in computing programming and data processing.

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 and computer programming to support your application of these techniques.

Data Science is an area identified by business and government as having specialist skill shortages, and the Data Science degree, one of only a few in the UK, will provide the specialist knowledge and skills necessary for careers not only in data science, but also more broadly within mathematics, statistics and 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.

An optional placement year, usually salaried, is a very important feature of the course: it can give you a distinct advantage in the job market on graduating and may even lead to an offer of employment with your placement provider. We have an experienced Placements Office to provide support in finding a placement that is right for you.

In summary, the course aims to:

- Develop a broad based knowledge of mathematics and statistics and the skills to apply this knowledge.
- Equip you with the knowledge and skills necessary for a wide range of careers linked to mathematics or computing.
- Provide you with sufficient specialised knowledge and skills to enable you to pursue further study and research, or a career in data science.
- Equip you with analytic problem solving skills and other transferable skills to prepare you for graduate employment in a wide range of careers.
- Enable you to realise your full academic potential whatever your background prior to coming to university, and to enhance your employment and careers opportunities.

A version of this course is also offered with an integrated foundation year – BSc (Hons) Data Science (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 broad range of mathematics and statistics (M).
- K2. Demonstrate an understanding that mathematics and statistics are developing subjects with widespread applications.
- K3. Construct and analyse mathematical and statistical models of real-world phenomena, and assess their utility (M).
- K4. Demonstrate an understanding of the need for rigour within mathematics (M).
- K5. Demonstrate knowledge and understanding of the fundamental characteristics of computer systems (C).
- K6. Demonstrate a good understanding of the theory underpinning your technical skills (C).
- K7. Evaluate, select, and implement appropriate tools and techniques to solve a range of problems in mathematics and computing (M, C).
- K8. Apply engineering principles (including analysis, design and evaluation) to the solution of practical computing problems (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 and interpret the results (M).
- S2. Select and apply appropriate analysis and design techniques to computing problems (C).
- S3. Program and implement computer systems using the tools of the computing professional (C).
- S4. Construct mathematical arguments, identifying assumptions and conclusions (M).
- S5. Evaluate requirements; define, analyse and solve problems; and evaluate potential and existing solutions (C).
- S6. Demonstrate good written and oral communication skills, presenting arguments and conclusions accurately and clearly (M, C).
- S7. Demonstrate a high level of IT competency and numeracy; for example, in the use of professional mathematical or statistical software, or in gathering, organising and analysing technical and numerical information (M, C).
- S8. Plan work, work effectively as part of a team, and work and learn independently (M, C).
- S9. Manage your own learning and make use of appropriate texts and other learning resources (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) Data Science have been developed by our expert staff 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, including from other courses, 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 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. It may include the use of tests, or 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. For example, your final year Project will involve giving an oral presentation and writing a dissertation.

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 transferable skills such as time management and communication skills, as valued by employers.

Some coursework assessments will involve working together in small groups, not only with students from your course, but also with students from other courses on the same module. In particular, the Problem Solving module requires you to work in a group to create a business proposal, with each team member taking on a particular role (e.g. chief executive, data analyst, marketing analyst or financial analyst). These projects explicitly develop and test skills needed within the workplace with different team members coming from different courses and therefore bringing together different skill sets, knowledge and experiences.

10. Course structure and curriculum

You will study a range of modules as indicated below.

Year 1

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

Year 2

Problem Solving	20 cps
Discrete Mathematics & Complexity	20 cps
Probability and Statistical Inference	20 cps
Linear Algebra and its Applications	20 cps
Systems Software	20 cps
Introduction to Database Engineering	20 cps

Year 3

Industrial Placement year for Sandwich students

Year 3/4

Stochastic Processes	20 cps
Optimisation	20 cps
Artificial Intelligence	20 cps
Distributed Database Engineering	20 cps
And either	
Project (Mathematics)	20cps
Professional Mathematics Skills	20cps
Or	
Project (Computing)	40cps

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 working within a company for at least 36 weeks between your second year and your third year. 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, or an International Diploma in Professional Practice for an international placement. If you are successful in completing a placement of between 6 and 35 weeks' duration, then you will receive a Certificate of Professional Practice. Opportunities also exist to study abroad, ranging from summer schools to year-long exchange programmes. In Full Time mode, you will go directly into the third year after your second year.

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 20%) and your final year mark (weighting 80%). 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).

11. Admission to the course

For current information regarding all entry requirements for this course, please see the 'Applying' tab on the NTU course information web page. The full UCAS entry profile for this course can be found at: <http://www.ucas.com/>

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, and the online course handbook that contains essential information about the course and the support we provide for your learning. You will also meet your Personal Tutor, Year Tutor, Course Manager, and Student Mentor (students in year 2 or 3 of your course).

You are assigned a Personal 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 support above, 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.

This course will equip you with the knowledge and transferable skills for employment in a broad range of fields related to mathematics, statistics and data processing. Graduates in data science are in high demand throughout industry such as engineering, management, business, commerce, and the public sector, and also suitable for the education sector in roles such as teaching.

Graduates who choose to venture into other sectors will be equally successful in gaining employment because of the many transferable skills developed on this course. Skills such as numeracy and reasoning, computer programming and data processing, 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, either whilst 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												
	<p>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.</p> <p>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 module and course level inform the Interim Course Report (ICR), which reviews and evaluates the student experience at course level. In turn the ICR informs the School Standards and Quality Report (SSQR), which is presented to the University as part of the institutions quality assurance and enhancement cycle. The ICR also informs a Periodic Course Review every three years to ensure that the course remains current and that standards have been maintained.</p>												
15.	Assessment regulations												
	<p>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:</p> <p>There are no course specific exceptions from the University regulations.</p>												
16.	Additional Information												
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